SURI VIDYASAGAR COLLEGE

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List of Year Wise Publications in the UGC CARE Listed Journals

Sl No	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Is it listed in UGC CARE list
Paper Published in the year 2018							
1	Identification of Determinant Factors for the Development of C.D. Blocks in Birbhum District: A Multivariate Statistical Approach	Ranajit Ghosh	Geography	Online International Interdisciplinary Research Journal	2018	2249-9598	YES
2	Assessment of the Quality of the Health in Rural Areas of Purba Bardhaman District, West Bengal, India: A Quantitative Approach	Ranajit Ghosh	Geography	Research Journal of Humanities and Social Sciences	2018	0975-6795	YES
3	Naẓra ‘ala al-I‘tirāḍāt ‘ala Sūra al-fīl li al-’Imām Abdul Ḥamīd al-Farāhi	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2018	2321-7928	YES
4	Al-Ihtifāl bi al-Yaum al- al ‘Ālami li al-Lugha al-‘Arabiyyah fi Kulliya Suri Vidyasagar (Report)	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2018	2321-7928	YES
5	Detection of Pesticides in Aqueous Medium and in Fruit Extracts	Partha Mahata	Chemistry	Inorganic chemistry	2018	0020-1669	YES

	using a Three-Dimensional Metal–Organic Framework: Experimental and Computational Study						
6	Trace-level and selective detection of uric acid by a luminescent Zn (II) based 1D coordination polymer in aqueous medium	Partha Mahata	Chemistry	Journal of Photochemistry and Photobiology A: Chemistry	2018	1010-6030	YES
7	A luminescent cadmium based MOF as selective and sensitive iodide sensor in aqueous medium	Partha Mahata,	Chemistry	Journal of Photochemistry and Photobiology A: Chemistry	2018	1010-6030	YES
8	Induction of Catalytic Activity in ZnO Loaded Cobalt Based MOF for the Reduction of Nitroarenes	Rupinder Kaur, Manmohan Chhibber, Partha Mahata and Susheel K Mittal	Chemistry	ChemistrySelect	2018	2365-6549	YES
9	Investigation of optical and electrical properties of erbium-doped TiO2 thin films for photodetector applications	Sanjib Mondal,	Physics	Journal of Materials Science: Materials in Electronics	2018	1573-482X	YES
Paper Published in the year 2019							
10	Naẓra ʻala al-Iʻtirāḍāt ʻala Sūra al-fīl li al-ʾImām Abdul Ḥamīd al-Farāhi	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2019	2321-7928	YES

11	Al-Intiqād ʻala Tārīkh Manāsik al-Ḥajj	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2019	2321-7928	YES
12	Deposition of ZnO Thin film for transistor fabrication	Soumyarajan Bhattacharyya	Physics	Int. J.Res. Eng.Appl. Management	2019	2454-9150	YES
13	Study of SiOx insulating layer for intregation with Si technology	Soumyarajan Bhattacharyya	Physics	Int. J.Res. Eng.Appl. Management	2019	2454-9150	YES
14	Fabrication and Characterization of transparent nanocrystalline ZnO thin film transistor by a sol-gel technique	Soumyarajan Bhattacharyya	Physics	Bull.Mater. Sci.	2019	0973-7669	YES
15	Characterization of a tea pest specific *Bacillus thuringiensis* and identification of its toxin by MALDI-TOF mass spectrometry	Amarnath Chattopadhyay	Microbiology	Industrial Crops & Products	2019	0926-6690	YES
16	Phylogenetic relationship of some species of Allium L. on the basis of morphological, biochemical and cytological study	Anirban Paul	Botany	International Journal of Recent Scientific Research	2019	0976-3031	YES
17	Groundwater quality assessment using multivariate statistical technique and hydro-chemical facies	Ranajit Ghosh	Geography	SN Applied Sciences	2019	2523-3971	YES

	in Birbhum District, West Bengal, India						
18	Ahammiyya al-Naẓm fī fahm al-Qur'ān	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2019	2321-7928	YES
Paper Published in the year 2020							
19	Deposition and charactrization of ZnO nanoneedles by facile solution process	S. R . Bhattacharyya	Physics	Journal of Advance Scientific Research	2020	0976-9595	YES
20	Fabrication and Characterization of Al dopped ZnO thin film by PVD technique	S. R . Bhattacharyya	Physics	Journal of Advance Scientific Research	2020	0976-9595	YES
21	Vertically aligned Al-Dopped ZnO Nanowires Arrays as Efficient Photoanode for Dye -Sensitized Sollar Cell	S. R . Bhattacharyya	Physics	Journal of Electronic Materials	2020	0361-5235	YES
22	On the Uniqueness theorems of L-Functions Concerning Weighted Sharing	Nirmal Kr. Datta	Physics	Advances in Mathematics: Scientific Journal	2020	1857-8365	YES
23	Nadwa 'Ilmiyya Duwaliyya Ḥaula Tārīkh Madrasa al-Islāḥ	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2020	2321-7928	YES
24	A Lanthanide Doped Metal-Organic Framework Demonstrated as	Debabrata Saha, P.Mahata,	Chemistry	Journal of Photochemistry &	2020	ISSN:1010-6030 E-	YES

	Naked Eye Detector of a Trace of Water in Organic Solvent including Alcohols by Monitoring the Turn-on of Luminescence			Photobiology, A: Chemistry		ISSN:1873-2666	
25	Eco-friendly management of mealy bug (Maconellicoccus hirsutus Green) on som plant (Machilus bombycina King) using bio-pesticide.	Tanmoy Mandal	Plant Protection	Research Journal of Agricultural Science	2020	0976-1675	YES
26	Assessment of variation of land use/land cover and its impact on land surface temperature of Asansol subdivision	Ranajit Ghosh	Geography	The Egyptian Journal of Remote Sensing and Space Sciences	2020	1110-9823	YES
27	Application of DRASTIC model for assessing groundwater vulnerability: a study on Birbhum district, West Bengal, India	Ranajit Ghosh,	GEOGRAPHY	Modeling Earth Systems and Environment	2020	2363-6203	YES
28	Evaluation of Cytotoxic Potential of Acetamiprid on *Allium cepa* L.	Sandipan Chatterjee and Anirban Paul	Botany	Research Journal of Agricultural Sciences	2020	0976-1675	YES
29	Evaluation of Phylogenetic Relationships of some Medicinally Important	Anirban Paul	Botany	Advances in Zoology and Botany	2020	2331-5091 (Online)	YES

	species of *Solanum* Based on Seed Protein Profile of SDS-PAGE						
30	Phytochemical screening and in-vitro evaluation of antibacterial potential of leaf extract of Eucalyptus globules against some pathogenic bacteria	Sandipan Chatterjee	Botany	Research Journal of Agricultural Sciences	2020	0976-1675	YES
31	Electromagnetically induced transparency and electromagnetically induced absorption in Y-type system	Kalan Mal,	Physics	Chinese Physics B	2020	1674-1056	YES
32	Atom Localization in cascade type system	Kalan Mal,	Physics	Journal of Physics: Conference Series	2020	1742-6588	YES
33	Electromagnetically induced transparency in Y-type atomic system	Kalan Mal,	Physics	Journal of Physics: Conference Series	2020	1742-6588	YES
34	An experimental and theoretical understanding of a UV photodetector based on Ag nanoparticles decorated Er-doped TiO2 thin film	Sanjib Mondal,	Physics	Ceramics International	2020	0272-8842	YES
35	Detection technique for vitamin D3 using Er-dopped TiO2	Sanjib Mondal,	Physics	**Journal of nanoparticles**	2020	**2314-4858**	YES

	nanowire based UV photodetector						
36	UNIQUENESS OF L FUNCTION AND ITS CERTAIN DIFFERENTIAL MONOMIAL CONCERNING SMALL FUNCTIONS	Nintu Mandal and Nirmal Kr. Datta	Physics	J.Math. Comput. Sci.	2020	1927-5307	YES
37	On the Uniqueness theorems of L-Functions Concerning Weighted Sharing	Nirmal Kr. Datta	Physics	Adv. Math. Sci. J	2020	1857-8438	YES
38	Small Functions and Uniqueness of Difference Differential Polynomials of L-functions	Nirmal Kr. Datta	Physics	Int. J. Diff.Eqn	2020	0973-6069	YES
39	Polynomial Sharing and Uniqueness of Differential-Difference polynimials of L-functions	Nirmal Kr. Datta	Physics	Adv. Dyn. Sys. And Appln.	2020	0973-5321	YES
40	Optical, Structural, and antibacterial properties of biosynthesized Ag nano particles at room temparature using *Azadirachta indica* leaf extract	Amarnath Chattopadhyay	Microbiology	Chinese Journal of Physics	2020	0577-9073	YES
41	Daur-u-'Ulamā-i-Madrasa al-Islāḥ fī Taṭwīr al-Ṣiḥāfa al-'Arabiyya fī al-Hind	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2020	2321-7928	YES

42	Makānāt al-Ḥadīth wa al-Sunnah ‘ind al-Imām al-Farāhi	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2020	2321-7928	YES
43	Parameters Of Child Mortality In Four Eastern States Of India	Ramanan da Roy	Econo mics	Shodh Sarita	2020	2348-2397	YES
44	A Preliminary Study of Tanchangya Consonant System	**Susanta Kr. Bardhan**	English	*Indian Linguistics*	2020	0378-0759	YES
Papers Published in the year 2021							
45	The response of groundwater to multiple concerning drivers and its future: a study on Birbhum District, West Bengal, India	, Ranajit Gh osh,	GEOG RAPHY	Applied Water Science	2021	2190-5487	YES
46	Asymmetric nexus between air quality index and nationwide lockdown for COVID-19 pandemic in a part of Kolkata metropolitan, India	Ranajit Ghosh,	GEOG RAPHY	Urban Climate	2021	2212-0955	YES
47	Analysis of unsteady magnetohydrodynami c radiative thin liquid film flow, heat and mass transfer over a stretching sheet with variable viscosity and thermal conductivity	Dr. Prasenjit Saha	Mathe matics	International Journal for Computation al Methods in Engineering Science and Mechanics	2021	1550-2287	YES

48	Microwave assisted gain in inverted -Y type atomic system	Kalan Mal,	Physics	Optik	2021	0030-4026	YES
49	Detailed experiental and theoretical analysis of the high-temperature current conduction properties of Er-doped TiO2 thin film based diodes	Sanjib Mondal,	Physics	Materials science in Semiconductor Processing	2021	1369-8001	YES
50	UNIQUENESS OF DIFFERENCE DIFFERENTIAL POLYNOMIALS OF L-FUNCTIONS CONCERNING WEIGHTED SHARING	Nirmal Kr. Datta	Physics	Int. J. Appl. Math	2021	1311-1728	YES
51	UNIQUENESS THEOREMS CONCERNING L-FUNCTIONS AND WEAKLY WEIGHTED SHARING	Nirmal Kr. Datta	Physics	J.Math. Comput. Sci.	2021	1927-5307	YES
52	Al-Mullā Niẓāmuddīn Mukhaṭṭiṭan lil Minhāj al-dirhāsī al-niẓāmī	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2021	2321-7928	YES
53	Al-Ma'āhid al-Ta'līmiyyah al-latī Ta'llama fīha al-Burufesūr Faizanullah al-Farooqi	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2021	2321-7928	YES
54	Mother's Autonomy And Maternal, Newborn And Child Care In Some Eastern States Of India	Ramanan da Roy	Economics	Shodh Sarita	2021	2348-2397	YES

55	Nonlinear Thermal radiation and temperature dependent viscosity effect on MHD heat and mass transfer in a thin liquid film over a stretching Surface	Dr. Prasenjit Saha	Mathematics	J. Math. Comput. Sci.	2022	2008-949X	YES
56	An Introduction to Multi Metric Spaces	Dr. Sujoy Das,	Mathematics	Advances in Dynamical Systems and Applications (ADSA)	2021	0973-5321	YES
57	Some Topological Properties Of Multi Metric Spaces	Dr. Sujoy Das,	Mathematics	Journal of Mathematical and Computational Science (JMCS)	2021	1927-5307	YES
58	Multi Linear Operator On Multi Normed Linear Space	Dr. Sujoy Das,	Mathematics	Journal of Mathematical and Computational Science (JMCS)	2021	1927-5307	YES
59	Spectroscopic, microscopic and antibacterial studies of green synthesized Ag nanoparticles at room temperature using *Psidium guajava* leaf extract	Amarnath Chattopadhyay,	Microbiology	Korean J. Chem. Eng	2021	0256-1115	YES
60	Control syntesis of low aspect ratio Zn1-xAgxO nanorods using low temperature solution route: Evidence of Ag concentration	, Amarnath Chattopadhyay,	Microbiology	Materials Research Bulletin	2021	0025-5408	YES

	dependent shape transition						
61	Bio-synthesis of ZnO nanoparticles and their in-situ coating on cotton fabric using *Azadirachta Indica* leaf extract for enhanced antibacterial activity	Amarnath Chattopadhyay,	Microbiology	Materials Technology	2021	0025-5408	YES
62	Al-'Arud wa al-Qawāfi wa she'r al-Imām al-Farāhi Numudhajan	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2021	2321-7928	YES
63	Study on phonological diversity of Chlorophycean algae with its role in environment	Sandipan Chatterjee	Botany	Annals of Romanian Society for Cell Biology	2021	2067-8282	YES
64	Evaluation of the effect of deadly Mucormycosis in post covid-19 patients	Sandipan Chatterjee	Botany	Turkish Journal of Physiotherapy and Rehabilitation	2021	2651-446X (Online)	YES
65	Cassia roxburghii DC. (Fabaceae; subfamily: Caesalpinioideae); an addition to the flora of West Bengal	Shamim Alam	Botany	Phytotaxonomy	2021	0972-4206	YES
66	Abhijñānaśa-kuntale PratiphalitaTatkālīnGrāmyaJīvanr Svarūpānusan-dhān	Biswajit Raj	Sanskrit	Antarmukh Research Journal	2021	2249-3751	YES
Papers Published in the year 2022							
67	EFFECTS OF DIFFERENT DRUG BINDING IN STENTED POROUS	Dr. Ramprosad Saha	Mathematics	Palestine Journal of	2022	2219-5688	YES

	ARTERY TISSUEWALL: A NUMERICAL MODEL STUDY (pp. 84-94)			Mathematics (PJM)			
68	SPECIFIC AND NON-SPECIFIC DRUG BINDING ELUTED FROM A HALF-EMBEDDED CARDIOVASCULAR DRUG-ELUTING STENT AND ITS RETENTION IN POROUS VESSEL WALL: A NUMERICAL MODEL STUDY	Dr. Ramprosad Saha	Mathematics	Bulletin of the Calcutta Mathematical Society (print only) (CMS)	2022	0008-0659	YES
69	**An introduction to multi inner product spaces**	Sujoy Das	Mathematics	***Communications in Mathematics and Applications" (CMA)***	2022	**0976-5905**	YES
70	Fabrication of MnO2 Nano Particles from Simple Pyrolytic Method for Degradation of Methylene Blue under Visible Light Irradiation	Sandip Mondal	Chemistry	Oriental Journal of Chemistry	2022	0970-020X	YES
71	Role of Ag Nanoparticles on Photoluminescence Emissions, Antibacterial Activities, and Photocatalytic Effects in ZnO-Ag Nanocomposites	Amarnath Chattopadhyay,	Microbiology	Materials Technology	2022	1066-7857	YES

	Synthesized via Low Temperature Green Synthesis Method Using Azadirachta Indica Leaf Extract						
72	Abū Uthmān al-Jāhiz	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2022	2321-7928	YES
73	Estimation of Biological Toxicity by Copper oxychloride on *Pisum sativum* L. and *Vigna radiata* L.	Anirban Paul,	Botany	Indian Journal of Agricultural Research	2022	0976-058X (Online)	YES
74	Biosorption of heavy metal by bacteria for sustainable crop production	Anirban Paul and Sandipan Chatterjee	Botany	Materials Today: Proceedings	2022	2214-7853	YES
75	Exploring True Knowledge from a scientific and philisophical Stand Point	Dr. Dinesh Kumar Das and Dr. Abhijit Sen	Sanskrit & Physics	SAMSKRTA VIMRSAH	2022	0975-1769	YES
76	Analysis of heavy metal-induced toxicity on the successful development and hatching of grasshopper	Chandrik Malalkar	Zoology	International Journal of Entomology Research	2022	2455-4758	YES
77	Present Status of Entomophagy in India	Chandrik Malalkar	Zoology	Bulletin of Enviroment Pharmacalogy and Life Sciemces	2022	2277-1808	YES
78	Analysis of Plant-based Registered GI Products of West Bengal	Shamim Alam, Sandipan Chatterjee and	Botany	Research Journal of Agricultural Sciences	2022	0976-1675 (P)	YES

		Anirban Paul					
79	Entomophilic pollination of *Foeniculum ulgare* Gaertn	Hemanta Saha, Anirban Paul and Chandrik Malakar	Botany, Zoology	International Journal of Entomology Research	2022	2455-4758	YES
80	An overview on bio-pollinators in present scenario	Hemanta Saha, Anirban Paul, Dhaniram Biswas and Chandrik Malakar	Botany, Zoology	International Journal of Entomology Research	2022	2455-4758	YES
81	Floral Biology and Pollination of *Abelmoschus esculentus* (L.) Moench.	Hemanta Saha	Botany	Research Journal of Agricultural Sciences	2022	0976-1675 (P)	YES
82	Influence of Fertilizer on Growth, Yield and Chlorophyll Contents of Ground Nuts	Tanmoy Ghosh, Anirban Paul and Sandipan Chatterjee	Botany	NeuroQuantology	2022	1303-5150	YES
83	SUNSCREENS IN INDIAN SCENARIO: AN OVERVIEW TOWARDS SKIN PHOTOPROTECTION	Sandip Mondal	Chemistry	International Journal of Novel Research and Development	2022	2456-4184	YES

84	Al-ʻAllāma al Maqrīzī wa Kitabuhū al Khiṭaṭ	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2022	2321-7928	YES
85	Musābaqa Kitaba al-Talkhīs li Muʻallafāt al-Imām ʻAbd al-Ḥamīd al-Farāhī (Report)	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2022	2321-7928	YES
86	Explanation of major determinants of poverty using multivariate statistical approach and spatial technology: a case study on Birbhum district, West Bengal, India	Ranajit Ghosh,	Geography	GeoJournal	November, 2022	1572-9893 (0); 0343-2521(p)	YES
87	Structural, optical, and antibacterial properties of Li-doped ZnO nanoparticles synthesized in water: evidence of incorporation of interstitial Li	Amarnath Chattopadhyay,	Microbiology	Physica Scripta	44896	0256-1115	YES
88	Neurotic Science in Plants as Stated in Ayurveda	Dr. Dinesh Kumar Das	Sanskrit	Samskrit Vimarsh	2022	0975-1769	YES
89	Completeness in Multi Metric Spaces	Dr. Sujoy Das	Mathematics	South East Asian Journal of Mathematics and Mathematical Sciences	2022	0972-7752	YES
90	Representation of women in Panchatantra: A socio cultural study	Debarati Chandra	English	Pracya	2022	2278-4004	YES

Paper Published in the year 2023							
91	Role of Pollinators in Plant Reproduction and Food Security: A Concise Reiew	Hemanta Saha, Sandipan Chatterjee and Anirban Paul	Botany	Research Journal of Agricultural Sciences	2023	0976-1675 (P)	YES
92	Role of Plants for Evaluation of Air Pollution Tolerance Index on the Basis of Some Biochemical Parameters: A Concise Review	Anirban Paul, Sandipan Chatterjee , Chandrik Malakar and Hemanta Saha	Botany, Zoology	Ecology Enironment and Conservation	2023	0971-765X	YES
93	Biomarkers for the Assessment of Pesticide Toxicity in Fish	Dipa Mondal	Zoology	International Journal of Zoological Investigations	2023	2454-3055	YES
94	Al-Hind al-Islamiyyah: Tārīkhuha wa Ḥaḍāratuha (‘Asr al-Siyadah al-Arabiyyah) (Book Review)	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2023	2321-7928	YES
95	Maulana Salahuddin (Obituary)	Dr. Mohd Moatasim Azmi	Arabic	Majalla-tul-Hind	2023	2321-7928	YES
96	Al nanoparticles decorated Er:TiO2 thin film based plasmonic photodetector	Sanjib Mondal,	Physics	Ceramics International	2023	0272-8842	YES
97	Unvelling Susruta's Leacy: Ancient	Dr. Dinesh Kumar Das, Dr. Hemanta	Sanskrit. Zoolog	Intrnational Journal of		2454-3055	YES

	Anatomy and the Concept of Sira	Saha, Dr. Chandrik Malakar	y and Botany	Zoological Investigations			
98	Demands for Maternal Heath Inputs in Eastern States of India	Ramanan da Roy	Econo mics	The Indian Economic Journal	2023	0019-4662	YES
99	In vitro generation of pharmaceutically important medicinal plants using Silver Nanoparticles: A concise Review	Anirban Paul, Hemanta Saha, Chandrik Malakar and Kalan Mal	Botany, Zoolog y,Physi cs	Ecology Enironment and Conservation	2023	0971-765X	YES
100	**Effect of Light Pollution on Macroscopic Living System: Aconcise Review**	**Kalan Mal, Anirban Paul and Chandrik Malakar**	**Physics, Botany, Zoology**	***International Journal of Zoological Investigations***	2023	**2454-3055**	YES
101	**Effect of Light Pollution on Macroscopic Living System: Aconcise Review**	**Kalan Mal**	**Physics**	***J.Phys.B. Mol. Opt. Phys***	2023	**1361-6455**	YES
Paper Published in the referred journals other than UGC CARE listed in year 2018							
102	Coleridge's Kubla Khan: A Stylistic Reading	Susanta Bardhan	English	*appropriations* .	2018	0975-1521	NO

103	Mulyabodh: Swamijir Sikha bhabanay	Susanta Raha	Library	Abhimukh	2018	**2349-4107**	NO
104	**Paragmilone tap utpadankari Udbhid**	Anirban Paul	Botany	Abhimukh	2018	**2349-4107**	NO
105	**Rabichchaya:Rabindranather ganerprothom sakalon Grantha**	Pinki Mondal	Bengali	Abhimukh	2018	**2349-4107**	NO
106	**Raindranath o Chalachitra**	Pinki Mondal	Bengali	Abhimukh	2018	**2349-4107**	NO
107	**Agranhita Rajsekhar**	**Ujjwal Kumar Gangapadhyay**	Bengali	**Sampan**	2018	**2395-2342**	NO
108	**Parashuram o Rajshekhar Basu r Granthapanjy**	**Ujjwal Kumar Gangapadhyay**	Bengal	**Sampan**	2018	**2395-2342**	NO
109	**Rajshekhar Charchapanji**	**Ujjwal Kumar Gangapadhyay**	Bengal	**Sampan**	2018	**2395-2342**	NO
110	**Francis Bradley Birt O 'The Story of an Indian Upland'**	**Partha Sankha Mazumdar**	History	Anustup	2018	**09 74-2697**	NO
111	***Indian Settlement in Arabia***	**Dr. Mohd Moatasim Azmi**	Arabic	***The Indian Journal of Arabic and***	2018	**2456-1215**	NO

				Islamic Studies			
Paper Published in the referred journals other than UGC CARE listed in year 2019							
112	**Archetypal Criticism and Indian Literature: An Overview**	**Susanta Bardhan**	English	Polyphony	2019	**2319-6424**	NO
113	Linguistic Interpretation of Macbeth's Soliloquies	**Susanta Bardhan**	English	Yearly Shakespare-2019	2019	0976-9536	NO
114	Gandijir Sikha Bhabana o bartamane tar prasangikata	**Rita Mukherjee**	Philosophy	Abhimukh	2019	**2349-4107**	NO
115	**Sarbodoy Andolon O Gandhijir boi para**	**Susanta Raha**	Library	Abhimukh	2019	**2349-4107**	NO
116	***Interpretation of*** **"إِنَّ ٱللَّهَ فَقِيرٌ وَنَحۡنُ أَغۡنِيَآءُ"**	**Dr. Mohd Moatasim Azmi**	Arabic	***The Indian Journal of Arabic and Islamic Studies***	2019	**2456-1215**	NO
117	**A review of Combining Ayurvedic Therapy with Nanoparticles and Temporary Drugs.**	**Hemanta Saha, Uttam Kumar Sen, Chandrik Malakar, Dhaniram Biswas and Dinesh Kumar Das**	Botany	***International Journal of Research and Analytical Reviews***	2019	**2349-5138**	NO
118	**Floral Biology And Pollination Of Vigna Catjang Endl.**	**Hemanta Saha**	Botany	***International Journal of Creative Research Thoughts***	2019	**2320-2882**	NO

Paper Published in the referred journals other than UGC CARE listed in year 2020							
119	**Humanistic Psychology and ESL Teaching: Some Reflections**	**Susanta Kr. Bardhan**	English	***Polyphony***	2020	**2319-6424**	NO
120	Amitav Ghosh's Gun Island: An Ecocritical Concern	**Susanta Kr. Bardhan**	English	*The Interiors*	2020	2319-4804	NO
121	Cauldron Scene of Shakespeare's *Macbeth*: A Rasa-Theoretical Study	**Susanta Kr. Bardhan**	English	Yearly Shakespeare. 2020.	2020	0976-9536	NO
122	**Relevance and Impact of Cārvāka Philosophy in Modern Age**	**Biswajit Raj**	**Sanskrit**	***Ananta***	2020	**2394-7519**	NO
123	DIGITALISATION AND ITS IMPACT ON SANTALS' ECOLOGY: A PHILOSOPHICAL OUTLOOK	DASARATH MURMU	**Philosophy**	IJIRMF: VOL- 6, ISSUE-8	2020	ISSN: 2455-0620	NO
124	THE WORLDVIEW OF TREIBALS AND BAULS: A COMPARATIVE STUDY WITH SPECIAL REFERENCE TO SANTAL AND LALON FAKIR	DASARATH MURMU	**Philosophy**	IJIRMF: VOL- 6, ISSUE-8	2020	ISSN: 2455-0620	NO
125	**Studies on Esterase and Peroxidase activity of Lens culinaris Medik. in relation to Stigma Receptivity**	**Hemanta Saha**	**Botany**	***Journal of Emerging Technologies and Innovative Research***	2020	**2349-5162**	NO
Paper Published in the referred journals other than UGC CARE listed in year 2021							
126	Chakma Prominence Pattern and Catalexis	**Susanta Kr. Bardhan**	**English**	Journal of *RASE*	2021	0975-3419	NO

127	**Swadinata purba Bangalir Inreji kabita Charcha: Ekti Samikha**	**Susanta Kr. Bardhan**	**English**	***Abhimukh***	2021	**2349-4107**	NO
128	**Soumitra Chattopadyay: Natake Phire dekha**	**Susanta Raha**	**Library**	***Abhimukh***	2021	**2349-4107**	NO
129	**Bolpurer Dui Bismirta Shahid**	**Partha Sankha Mazumdar**	**History**	Rabibasariya Anandabazar Patrika	2021		NO
Paper Published in the referred journals other than UGC CARE listed in year 2022							
130	***RABINDA DARSHANE AMIR DHARONA***	**Ramesh Das**	**Philosophy**	**SCHOLAR PUBLICATIONS, KARIMGANJ, ASSAM, INDIA**	2022	**2349-6711**	NO
131	**A pragmatic critical study of Mahesh Daatani's final solutions**	**Susanta Kr. Bardhan**	**English**	***Victorian Journal of Arts***	2022	**0975-5632**	NO
132	**The Trial scene (at IV, scene I of the Merchant of Venice: A Pragmatic Study**	**Susanta Kr. Bardhan**	**English**	***Yearly Shakespeare2 2022***	2022	**0976-9536**	NO
133	**Marami Nazrul**	**Ujjwal Kr Gangopadhyay**	**Bengali**	***AJKER JODHON***	2022	**0871-5819**	NO
Paper Published in the referred journals other than UGC CARE listed in year 2018							
134	**Brahma Sangiter janak Rammohan Roy**	**Susanta Raha**	**Library**	***Abhimikh***	2023	**2349-4107**	NO
135	**Janma dwisatabarshe shradhargha- Nirbhik Sanbadik Harishchandra Mukhopadhyay**	**Susanta Raha**	**Library**	***Abhimikh***	2023	**2349-4107**	NO

136	**Sibratan Mitrer Rammohancharcha**	**Partha Sankha Mazumdar**	**History**	***Abhimikh***	2023	**2349-4107**	

Principal

Suri Vidyasagar College

Identification of Determinant Factors for the Development of C.D. Blocks in Birbhum District: A Multivariate Statistical Approach

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Abstract

The concept of development is a relative term, but if we want to define the term development it can be defined as improvement of human welfare, quality of life, social well being and satisfying peoples' needs and wants. So a large number of factors in terms of economic, socio-cultural, religion, infrastructural, commercial are involve for the development of a region. In the light of the above aspect an attempt has been made to identify the major factors for the development of Community Development blocks of Birbhum district on the basis of 16 selected variables by multivariate statistical technique, like principal component analysis (method of factor analysis). The study not only aims to identify the major factor of the development but also try to analyze the spatial discrimination of the extracted factors in 19 C.D Blocks of Birbhum District. After analyzing the factor as well as its spatial discrimination, it can be said that all the blocks are not well equipped evenly by four factors. Therefore, the policy makers should focus on each and individual factor separately and find out the exact cause of discrimination.

KEYWORDS: Principal component analysis, Eigen value, factor loading, factor analysis, spatial discrimination.

Introduction:

Geographers become increasingly interested in describing a complex spatial structure of a large number of socio-economic and others variables through some smaller number of underlying dimensions (Aslam Mahmood, 2013). Any administrative area can be well understood with the help of some factorial parameters. In this respect the major factor of development of an administrative area involves the complex interaction between social, cultural, political and economic aspect. The spatial variation in such level of socio-economic development is multidimensional phenomena (Thurstone, 1949, Berry, 1960, Thompson, 1962) can be well interpreted with the help of multivariate statistical approach. Among the different multivariate statistical technique Principal Component Analysis (A branch of factor analysis) is a technique designed primarily to synthesize a large number of variables into a smaller of general components, which retain the maximum amount of descriptive ability. It is a method to discover those hidden factors which might have generated the dependence or covariance among the variables (Morrison, 1967).

In the light of above discussion the present paper is try to bring out the major factors for the development of different C.D. Blocks of Birbhum District as well as to analyze the spatial variation of such factors or components of the respective district.

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RESEARCH ARTICLE

Assessment of the Quality of the Health in Rural Areas of Purba Bardhaman District, West Bengal, India: A Quantitative Approach

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ABSTRACT:
A well developed health infrastructure can accelerate the nation's chariot of development. In rural India, development of health care infrastructure is quite unsatisfactory. In 2005, National Rural Health Mission was launched which emphasized on strengthening the rural health care infrastructure. Health index has been developed using health inputs like number of medical institutions, number of beds, number of doctors in medical institutions and number of family welfare centers and sub-centers per thousand populations. In this article, health status has been studied in Purba Bardhamn district of West Bengal. All-round health status of Purba Bardhamn district is not satisfactory. The result reveals block wise discrepancies of health conditions in terms of number of medical institutions, number of beds, number of doctors in medical institutions and number of family welfare centers and sub-centers. Therefore, such kind of study can not only help to identify exact problems regarding health condition but also helps to take decision about what kind of health care policies should be implied to strengthen the rural health care infrastructure of the region.

KEYWORDS: Dimension Index, Health Index, Health care infrastructure.

INTRODUCTION:
Good health is not only the primary requirement of well-being of people; it also enhances economic growth of the nation (Saikia, 2014). For ideal human development and proper growth of any country, development of health status is considered as one of the key ingredients. With the improvement of health status, country makes its human capital more energetic and vibrant. As per the definition of World Health Organization (WHO) health, is a "State of complete physical, mental, and social well being, and not merely the absence of disease or infirmity."

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Webster stated that "the condition of being sound in body, mind or spirit, especially freedom from physical disease or pain". According to Oxford English Dictionary "soundness of body or mind; that condition in which its functions are duly and efficiently discharged". Health status of a country affects its economic growth and social well being through various channels (Ghatak and Das, 2012). When health status improves, the country can produce more output with any given combination of skills, physical capital and technological knowledge with its human capital (Sen, 2001). As per the Human Development Report of UNDP, health is one of the primary components of human development. That is why World Bank has started to give more priority to health development. Even though India is accelerating its economic growth over the last two decades, it has rated poorly in human development indicators and health indicators (Baru et al., 2010, Saikia, 2014). In UNDP

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نظرة على الاعتراضات على سورة الفيل للإمام عبد الحميد الفراهي

- الأستاذ نسيم ظهير الإصلاحي الغازي[1]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

"قد اتفق العالم الإسلامي على تفوق الشيخ عبد الحميد الفراهي فضلًا ومعرفة لكتاب الله بأنه لا يوجد له نظير في تفكيره واجتهاده ومعرفته للقرآن الكريم. ويمكن تقدير فضله العلمي من تأليفاته القرآنية وأجزاءه التفسيرية ومعرفة أنما كُتِبَ عن العلامة المرحوم خالٍ من شوب المبالغة".[3]

إن تفسير سورة الفيل من أجزاء التفاسير للشيخ عبد الحميد الفراهي، إنه رد بالدلائل على فكرة أن دمار جيش أبرهة قد وقع برمي الجمار من قبل الطيور الآتية من جانب البحر، وأن القريش وأهل مكة قد اختفوا في الجبال خوفًا من أبرهة وجيشه الجرار، ووفقًا لتحقيق الشيخ الفراهي أن القريش وأهل مكة والحجاج القادمين من الخارج لزيارة الكعبة، قاموا ضد هجوم جيش أبرهة حتى تسبب رميهم الشديد للحجارة والنصر من الله في انتشار جيش أبرهة جميعًا وتدميرهم الشامل.

لم يقبل بعض العلماء هذا التحقيق للشيخ الفراهي مما هو نتيجة التدبر والتفكر الطويل ومبني على الدلائل والشواهد القطعية، ومن بين هؤلاء المنكرين الشيخ شبير أحمد أزهر الميرثي الذي قام ببعض الاعتراضات على رأي الشيخ الفراهي المذكور آنفًا ونقلها في مجلة "الرشاد" الصادرة عن جامعة الرشاد بأعظم كره في عددها لأكتوبر-نوفمبر 1985م، فسوف نحلّل هذه الاعتراضات في السطور الآتية:

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[1] أستاذ التفسير والحديث بمدرسة الإصلاح، سرائ مير، أعظم كره، الهند

[2] مدرس ضيف، جامعة بردوان، بنغال الغربية

[3] "الجمعية" ترجمان جمعية العلماء (الهند) اليومية، 14 يونيو، 1946م

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الاحتفال باليوم العالمي للغة العربية في كلية "سيوري فيديا ساغر"

- د. محمد معتصم الأعظمي[1]

احتفل قسم اللغة العربية وآدابها بكلية سيوري فيديا ساغر (Suri Vidyasagar College)، سيوري في بنغال الغربية باليوم العالمي للغة العربية يوم السبت 22 ديسمبر 2018م بمناسبة اليوم العالمي للغة العربية. قد تخرج من هذه الكلية رئيس جمهورية الهند السابق باراناب موخارجي. وكان ضيف شرف هذا الحفل الدكتور أنيس الرحمن، أستاذ مساعد، قسم اللغة العربية، الجامعة العالية (كولكاتا، بنغال الغربية). وحضر الحفل عميد هذه الكلية الدكتور تابون كومار باريجا والدكتور محمد معتصم الأعظمي مدرس ضيف في قسم اللغة العربية بجامعة بردوان ووسيم رضا وبشير الهلال مدرسان ضيفان من كلية سيوري فيديا ساغر وغيرهم من الأساتذة الأجلاء من قسم اللغة البنجالية وقسم اللغة الإنجليزية وقسم الجغرافيا وقسم العلوم وقسم التجارة وقسم التاريخ وما إليها.

اشتمل برنامج هذا الاحتفال على جلستين فانعقدت الجلسة الأولى في الساعة 11:30صباحًا في قاعة جديدة للكلية وترأسها الدكتور تابون كومار باريجا عميد الكلية واستهلت فعاليات هذه الجلسة بتلاوة آيات من القرآن الكريم تلاها طالب في السنة الثانية من الليسانس في اللغة العربية اسمه مجاهد الإسلام ثم قامت عابدة خاتون طالبة من السنة الثالثة من الليسانس في اللغة العربية وأنشدت قصيدة البردة في المديح النبوي ﷺ كما ألقى طالب من السنة الأولى لليسانس خطبة باللغة العربية حول أهمية اللغة فترجمها أحد زملائه في

[1] مدرس ضيف، قسم اللغة العربية وآدابها، جامعة بردوان، بنغال الغربية

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Detection of Pesticides in Aqueous Medium and in Fruit Extracts Using a Three-Dimensional Metal−Organic Framework: Experimental and Computational Study

Debal Kanti Singha,[†,‡] Prakash Majee,[‡] Saurodeep Mandal,[‡] Sudip Kumar Mondal,*[,‡] and Partha Mahata*[,†]

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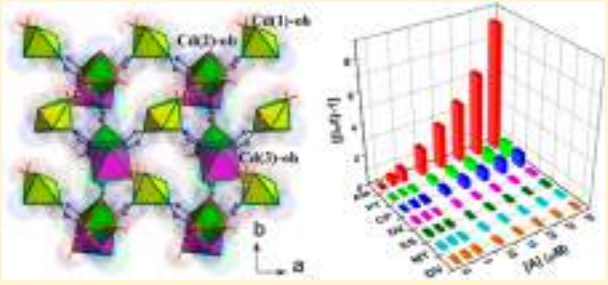
Supporting Information

ABSTRACT: A new, three-dimensional cadmium based metal−organic framework $[Cd_3(PDA)_1(tz)_3Cl(H_2O)_4]\cdot 3H_2O$ {PDA = 1,4-phenylenediacetate and tz = 1,2,4-triazolate}, **1**, has been successfully synthesized using slow diffusion method at room temperature. The structure of compound **1** has been determined using single crystal X-ray diffraction. The triazolate ligands connect three different types of octahedral Cd^{2+} ions to form a two-dimensional structure. The chloride ion and PDA ligands connect the two-dimensional layers to form a three-dimensional structure. The phase purity of **1** was confirmed by powder X-ray diffraction, thermogravimetric analysis, and IR spectroscopy. Aqueous dispersion of compound **1** gives intense luminescence emission at 290 nm upon excitation at 225 nm. This emission was used for the luminescence based detection of pesticides, especially azinphos-methyl, chlorpyrifos, and parathion in aqueous medium. The selectivity of pesticide detection remains unaltered even in the presence of surfactant molecules. The mechanisms of luminescence quenching were successfully explained by the combination of absorption of excitation light, resonance energy transfer, and the possibility of electron transfer. Experimental findings are also well supported by the density functional theory calculations. Selectivity of pesticides detection in real samples such as apple and tomato juice has also been observed.



INTRODUCTION

The rapid increase of population demands the production of vegetables and fruits in a short time.[1] For this purpose, the use of toxic organophosphorus pesticides is growing in cultivation, animal farming, and aquafarming to boost the production, as the pesticides protect these living objects from harmful microorganisms.[2−7] To combat against some vector-borne diseases like dengue and malaria and for wiping out the unwanted plants, pesticides have been recently used.[8] It has been observed that nearly 1% of the total applied pesticides literally are used by the targeted species and rest of the 99% applied pesticides are bioaccumulated through the food chain.[9,10] Azinphos-methyl, chlorpyrifos, and parathion are widely used pesticides among the organophosphorus pesticides used in recent times.[11−15] Accidental spillages during transport and storage and agriculture runoff from treated land are the main sources of pesticide contamination. Besides that, inhalation through the respiratory system and skin penetration upon dermal exposure are the well-defined paths of pesticide toxicity. Pesticides are also a major concern to the farmers who mix and apply these pesticides, as pesticides can be absorbed through the layers of the epidermis at different penetration rates.[16,17] Actually, the organophosphorus pesticides permanently damage acetylcholinesterase enzyme which is responsible for proper functioning of the nervous system by hydrolyzing the neurotransmitter acetylcholine and maintaining the proper neurotransmission within cholinergic networks.[18−27] Due to their high toxicity, the U.S. Environmental Protection Agency (EPA) categorized organophosphorus pesticides as toxicological class I (extremely toxic).[28,29] Therefore, for the sake of environmental protection and public health, it is important to design a method for the rapid detection of organophosphorus pesticides in aqueous medium and in real samples.

Detection of organophosphorus pesticides has been done using various methods such as liquid chromatography triple quadruple-tandem mass spectrometry,[30−32] gas chromatography−nitrogen phosphorus detection,[33,34] micellar electrokinetic chromatography,[35] potentiometry,[36,37] capillary electrophoresis,[38−40] flow injection spectophotometric analysis,[41] and cyclic voltametry with electrochemical liquid-phase microextraction.[42,43] Although these methods are very efficient with respect to sensitivity and limit of detection, they have some disadvantages like expensive, complicated sample preparation methods and requirement of longer time for analysis,

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Trace-level and selective detection of uric acid by a luminescent Zn (II) based 1D coordination polymer in aqueous medium

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ABSTRACT

A water soluble luminescent 1D metal organic coordination polymer of Zn(II) $[Zn(FDA)(2,2'\text{-bpy})(H_2O)]\cdot 2H_2O$ (2,2′-bpy = 2,2′-bipyridine and FDA = 2,5-furandicarboxylate), **1** was successfully synthesized by solvothermal method. This crystalline compound **1** showed strong luminescence emission at 325 nm upon excitation at 290 nm in aqueous medium. The luminescence intensity was highly sensitive towards a bio-metabolized purine derivative, uric acid (UA). However, it did not show any considerable response towards structurally similar other purine derivatives like adenine (Adn), guanine (Gua) and theobromine (Tbr). The compound **1** was found to be highly selective and sensitive towards uric acid (UA) with a detection limit of 300 ppb. The sensitivity and selectivity of **1** towards UA was also investigated in the presence of several metal ions, anions and organic biomolecules which are commonly found in human urine. The results indicated that **1** could be a potential probe for selective detection and estimation of UA in urine. The mechanism of the sensing was explained successfully and it was also supported by DFT calculation.

1. Introduction

Purine nucleotides breakdown to uric acid (UA) as the final oxidized product of the metabolic process in human body and it is one of the major component that is execrated through urine. UA is strong reducing agent as well as strong antioxidant; urate ion is the key component for antioxidant capacity in human blood plasma [1]. Xanthine and hypoxanthine produces UA by enzyme xanthine oxidase and is released in hypoxic condition [2]. The UA in both blood serum and urine is a pathological diagnostic indicator. Normally, UA is present in the blood in the concentration range 25–80 mg L^{-1} for male and 15–60 mg L^{-1} for female and is excreted 250–700 mg per day in urine [3]. About 70% of daily UA disposal occurs via the kidneys [4]. High UA concentration in blood serum may induce gout, in which the needle-shaped crystals of UA get precipitated in joints, skin, capillaries, and other tissues [5]. The hyperuricemia may be considered when 70 mg L^{-1} of UA is found in blood. Above 70 mg L^{-1} of UA result in supersaturated solutions which have tendency of crystal formation [6]. High serum UA is associated with higher risk of type 2 diabetes, kidney stones, cardiovascular disease, Tumor lysis syndrome, Lesch-Nyhan syndrome, obesity and hypertension [7–9]. Insulin resistance in diabetes may be a outcome of hyperuricemia [10]. Kidney stones can be formed through deposition of sodium-urate microcrystal when saturation levels of UA in blood is high [11]. UA crystals can also promote the formation of calcium oxalate stones, acting as seed crystals [12]. In case of hypouricemia, the low UA level occurs through various causes. Low zinc intake through food is one of causes for lower down the UA level. Patient having multiple sclerosis found UA level is quite low. Phosphate binder drugs also reduce UA significantly [13]. It is even more serious when oral contraceptive medicine is taken regularly [14].

It is very important to develop new methods and new materials for detection of UA for diagnosing both hyperuricemia and hypouricemia. In the recent past, several UA detection methods have been reported-such as electrochemical sensing [15–18], optical sensing [19–21], and high performance liquid chromatography [22] etc. using different materials like- nanocomosite [23,24], carbon dots [25], quantum dot [26], oxide nanoparticles [27–30], gold/silver nanoclusture [31–34], lanthanide metal organic framework [35,36] and dye derivatives [37,38].

Luminescent metal organic coordination polymers (MOCPs) are a new class of hybrid crystalline material with diverse structure and are synthesized by the metal ions or metal clusters and organic ligands.

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A luminescent cadmium based MOF as selective and sensitive iodide sensor in aqueous medium

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ABSTRACT

A highly luminescent three–dimensional cadmium based metal–organic framework (Cd-MOF), **1**, has been employed for the luminescence-based aqueous phase detection of iodide ion. Emission at 290 nm upon excitation at 226 nm was used for the sensing of iodide ions in aqueous medium through very high luminescence quenching. It was also observed that in presence of other common anions such as NO_3^-, $H_2PO_4^-$, CH_3COO^-, Br^-, SO_4^{2-}, $B_4O_7^{2-}$, Cl^-, CO_3^{2-}, HPO_4^{2-} and F^- in aqueous medium it shows negligible luminescence quenching. The selectivity of iodide sensing has also been performed in the presence of other halide ions (F^-, Cl^- and Br^-) and the quenching efficiency of iodide remains unaffected by the presence of halide ions. The compound **1** shows high sensitivity even in very low concentration regions towards the sensing of iodide with K_{SV} (quenching constant based on linear Stern–Volmer plot) value of $1.8 \times 10^4\ M^{-1}$ and with detection limit of iodide of 0.63 μM (80 ppb), which is among the best value known for any luminescence based selective iodide sensor reported to date.

1. Introduction

Nowadays, the sensing of anions in aqueous medium becomes highly desirable as the anions play a crucial role in a variety of chemical, biological and environmental process [1–4]. In recent years, iodide ion has got tremendous attention over the other biologically important anions because iodide plays a significant role in various biological activities such in normal human growth, neurological activity and thyroid function [5–8]. Therefore, the excessive iodide accommodation and iodine deficiency can generate several serious diseases [9–12]. For this purpose, to diagnose the proper functioning of metabolic, nutritional system and in the epidemiological studies of thyroid malfunction, the monitoring of iodide content in milk and urine is often performed. Iodine deficiency is still a serious public health problem in many countries though the addition of iodide into food (salt) has been utilized on a regular basis for the prevention of iodine deficiency [13]. Incidentally, the World Health Organization (WHO) has announced that iodine deficiency is the main cause of mental retardation on a global scale [14–16]. Moreover, elemental iodine is often used in various fields like in medicine as disinfectors, in organic synthesis for different transformation, in the industry as a dye and in other applications [17]. However, their improper discharge facilitates the generation of serious health and environmental problems.

Till date, many strategies have been developed for the determination of iodide including potentiometry [18], cyclic voltammetry with electrochemical liquid–phase microextraction [19], capillary electrophoresis [20], gas chromatography with mass spectrometry [21] and flow injection spectrophotometric analysis [22]. However, these methods are rather time-consuming, requires multistep and tedious sample preparations, sophisticated instrumentation. Besides that, the interference of coexisting anions seriously affected the performance of some techniques and these methods have the difficulty for the sensing of iodide in some real samples like urine. Therefore, some methods need to be developed so that we can chiefly and rapidly complete sensing and could be useful for real samples.

Recently, luminescence based sensing methods have been considered as an alternative method in the sensing of iodide as this method possesses several advantages like high simplicity, selectivity, portability, short response time and could be used in both solution and solid state [23,24]. Different kind materials including bis–imidazolium and benzimidazole derivative [25,26],

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Chemistry SELECT Full Papers

Inorganic Chemistry

Induction of Catalytic Activity in ZnO Loaded Cobalt Based MOF for the Reduction of Nitroarenes

Rupinder Kaur,[a] Manmohan Chhibber,[b] Partha Mahata,[c] and Susheel K. Mittal*[d]

Amalgamating the robust structures of metal organic frameworks with nanoparticles is one of the most devisable and logical approach in order to enhance their applicability. We report herein an easy wet impregnation method for loading ZnO nanoparticles with tunable sizes and shapes on a cobalt based metal organic framework constructed by using $CoCl_2.6H_2O$ and 4, 4'-oxy-bis (benzoic acid) (OBA). The size, composition and morphology of nanoparticles were characterized using powder X-ray diffraction (P-XRD), energy dispersive X-ray spectroscopy (EDX), high resolution transmission electron microscopy (HR-TEM), Raman spectroscopy, X-ray Photoelectron spectroscopy (XPS) and UV-Diffuse reflectance spectroscopy. The incorporation of nanoparticles does not affect the overall structural integrity of the framework whereas it induces the heterogenous catalytic capability for the reduction of nitro aromatics to their corresponding amines under benign conditions, which cannot be realized using bare MOF.

1. Introduction

Nanoscience has opened up a new arena of application in the world due to two reasons. One, the smallest measurable size and its application in diverse areas of human life[1–5] and second, the onset of new physico-chemical properties such as quantum-confinement effect and spectacular increase in the surface area of the materials.[6] However, the creation of nanoparticles (NPs) with desired properties and size is still a challenging task due to their high tendency to agglomerate and low thermodynamic stability.[7] Although such problems have been circumvented by the use of stabilizing and capping agents, but this comes at the cost of protective layer at the outer surface of particles that has to be activated before use. Thus, there has been a consistent effort to access and conserve the surface active sites of the nanoparticles by use of porous materials like silica,[8] zeolites,[9,10] alumina[11,12] and polymers.[13] Recently it has been reported that metal organic frameworks (MOFs), the coordination polymers comprising of metal nodes connected through organic ligands, possess the highest surface areas in comparison to the other porous materials[14–16] and also offer the advantage of tunable pore size, large internal pore volumes and high thermal stability. These properties can be utilized as a logical alternate as compared to the other porous materials for the synthesis of nanoparticles (NPs). A number of methods have been reported for the synthesis of MOF supported NPs. This includes wet impregnation,[17] chemical vapor deposition (CVD) method (commonly used for volatile precursors),[18,19] solid/mechanical grinding[20] and microwave assisted methods. A number of MOFs supported noble metal based NPs such as Au,[21] Ag,[22] Pt,[23] Pd,[24] Ru,[25] have been reported in literature. This has resulted in the enhancement or induction of the properties in the resulting composites such as catalytic,[26] magnetic[27] and electrochemical activities.[28] The methodology now desires improvement in terms of low cost, increased shelf life and efficient synthesis of nanoparticles-MOF composites for wider applications.

The reduction of nitro arenes to the corresponding amines is an important transformation in organic chemistry since many aromatic amines exhibit biological activities and find potential applications in dye and pharmaceutical industry.[29,30] Wide range of methods for the reduction of nitro compounds have been reported so far, such as catalytic hydrogenation[31] and metal-mediated reduction using Raney Ni, Pd/C etc.[32,33] The parameters like high cost and inadequacy of such metals act as barriers to their large or industrial scale applications. Conventional reductions of nitroarenes using zinc metal usually require corrosive reagents such as NH_3, conc. HCl, aq. NaOH, high temperatures, prolonged reaction times and sometimes use of ample quantities of zinc metal. Some reductions in an aqueous medium has also been reported to employ 7.25 equiv. of zinc metal at 80 °C.[34] On the other hand, modern methods rely more upon the use of catalysts having nano dimensions. Grirrane and his co workers[35] successfully used gold nanoparticles for the reduction of nitro aromatic compounds. However, the reductions were achieved using high pressured

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Investigation of optical and electrical properties of erbium-doped TiO_2 thin films for photodetector applications

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Abstract

We have investigated the electrical and optical properties of erbium (Er^{3+}) doped TiO_2 thin films (Er:TiO_2 TFs) grown by sol–gel technique on glass and silicon substrates. The samples were characterized by field emission gun–scanning electron microscopes (FEG–SEM), energy dispersive X-ray spectroscopy (EDX), atomic force microscopy (AFM), X-ray diffraction (XRD), photoluminescence (PL) and current–voltage measurement techniques. FEG–SEM and AFM images showed the morphological change in the structure of Er:TiO_2 TFs and EDX analysis confirmed the Er^{3+} doped into TiO_2 lattice. Broad PL emissions in visible and infrared regions were observed in undoped TiO_2 samples and associated to different mechanisms due to the anatase and rutile phases. PL spectra revealed sharp peaks at 525 nm, 565 nm, 667 nm and 1.54 μm which are related to Er^{3+} emissions in Er:TiO_2 samples. The undoped TiO_2 and Er:TiO_2 TFs based UV-photodetectors were fabricated, and various device parameters were investigated. The doped devices exhibit high photoresponse upon illuminating 350 nm UV light at 2 V bias with faster response time compared to undoped device.

1 Introduction

TiO_2 is an attractive material due to its efficient photo activity, high chemical stability, nontoxicity and cost-effectiveness [1–3]. It has been extensively used for making sensors [4, 5], ultraviolet (UV) detectors [6, 7], low cost solar cells [8] and for applications in photo-electrochemical water splitting [2]. The technological interests of rare earth luminescence are in the field of telecommunications [9], flat panel displays [10], laser materials [11], data storage [12], radiation detection [13], medical applications [14] etc. Several attempts have been made to enhance the photo activity of TiO_2 into the visible region by doping it with lanthanide materials like erbium (Er), europium (Eu), terbium (Tb) and cerium (Ce) [15–17]. Particularly, incorporation of Er^{3+} ions into TiO_2 semiconductors draws special attention due to some interesting features associated with its unique optical and electrical characteristics. The sharp photoemission from Er^{3+} doped TiO_2 at 1.54 μm due to intra 4*f*-shell transition of Er^{3+} ions, which has been reported by several groups [9, 11, 18], is important for telecommunication applications [18]. In addition, the interaction between the local electric field of the host and the 4*f* electrons is weak. Therefore, the local

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نظرة على الاعتراضات على بعض آراء الإمام عبد الحميد الفراهي

- الأستاذ نسيم ظهير الإصلاحي الغازي[1]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

نشرت مقالة لأخينا المكرم محمد رضي الإسلام الندوي حول "تاريخ مناسك الحج" في العدد المزدوج لشهري مايو ويونيو لعام 1987م من مجلة "حياتِ نو" الشهرية الصادرة عن بلرياغنج بمديرية أعظم كره، والهدف من ورائها لم يكن سوى الانتقاد على آراء وبحوث ترجمان القرآن الإمام عبد الحميد الفراهي التي عرضها العلامة الإمام عن السعي بين الصفا والمروة ورؤية إبراهيم عليه السلام عن ذبحه إسماعيل عليه السلام وحقيقة "رمي الجمرات" وغيرها في كتابيه الشهيرين "الرأي الصحيح فيمن هو الذبيح" و"تفسير سورة الفيل".

فقرأت هذه الانتقادات باهتمام لكوني طالبًا عاديًا للقرآن ولعلاقتي الدنيا مع مذهب أفكار الإمام الفراهي، وحينما فكّرت فيما قاله أخي الندوي في ضوء المراجع الأخرى فلم أكد أتفق مع آراء صديقي المكرم، فظننت من المناسب أن أعرض ما للفراهي من أفكار عالية وما للأخ الندوي من سخائف وخزعبلات كي يعرف القارئ ما هو الحق وما هو الباطل.

السعي بين الصفا والمروة: يكتب المعترض المحترم:

"إنّ الرأي الشهير عن السعي بين الصفا والمروة أنه تذكار واقعة هاجر عليها السلام عندما كانت تسعى بين الصفا والمروة باحثة عن الماء ---" بينما يقول الإمام الفراهي مشيرًا إلى خلفيتها الأخرى:

[1] أستاذ التفسير والحديث بمدرسة الإصلاح، سرائ مير، أعظم كره، الهند

[2] نائب مدير التحرير ومدرس ضيف، قسم اللغة العربية وآدابها، جامعة بردوان، بنغال الغربية

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الانتقاد على "تاريخ مناسك الحج"

- الأستاذ نسيم ظهير الإصلاحي الغازي[1]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

نشرت مقالة للأخ المكرم محمد رضي الإسلام الندوي حول عنوان "تاريخ مناسك الحج" في مجلة "الرشاد" الشهرية (عدد يناير، عام 1990م)، فانتقد فيها مقالتي "نظرة على الاعتراضات على بعض الآراء للإمام عبد الحميد الفراهي" التي نشرت في مجلة "حياتِ نو" الشهرية الصادرة من بلرياغنج بمديرية أعظم كره قبل سنة ونصف تقريبًا في العددين من شهري يوليو وأغسطس لعام 1988م، فقال إن فيها كثيرًا من الأشياء التي لا أساس لها، وبما أن هذا نقاش علمي فيجب عليّ بكوني كاتب المقالة أنْ أوضح أوّلًا الاعتراضات الموردة من الأخ الكريم لكي لا يسبّب ذلك الانتقاد سوء فهم:

ألف: "ذكرنا في مقالتنا أنّ قول ابن عباس في رواية "قال ابن عباس ﷺ قال النبي ﷺ فلذلك سعي الناس بينهما" إضافة بناء على أصل من المحدثين فقد ردّها بناءً على ذلك الأصل نفسه من المحدثين قائلًا "إنّ إضافة راوٍ موثوق به تكون موثوقًا بها، حيث وردت هذه الجملة في رواية ليس لها راوٍ غير موثوق به".

فنرد عليه قائلًا: قد أوضحنا في مقالتنا أن هذه الرواية قصة طويلة يمكن فيها النقص والزيادة وإلى جانبه وردت رواية عن "السعي" خاصة بما فيها سُئل ابن عباس ﷺ "ما هو سبب السعي؟" فقال "إن إبراهيم ﷺ حين ذهب به إسماعيل ﷺ للذبح فأسرع إلى هذا المكان" (وسنتحدث عن هذه

[1] أستاذ التفسير والحديث بمدرسة الإصلاح، سرائ مير، أعظم كره، الهند

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Deposition of ZnO Thin Film for Transistor Fabrication

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Abstract: ZnO thin films were deposited by laser ablation process onto quartz, glass and silicon (Si) substrates for application related to microelectronic devices. Microstructural study of the as deposited films indicated uniform crystalline grain growth; with c-axis orientation indicated by the typical (0002) XRD peak for h-ZnO with wurtzite structure. The optical study done by measuring the transmittance measurement in the visible wavelength range indicated direct wide band gap of 3.34 eV. Thin film transistor (TFT) fabricated out of these ZnO thin film samples indicated good transfer characteristics with field effect mobility (μ) and threshold voltage (V_T) of 0.027 $cm^2/V.s$ and 1.20 V, respectively. Further optimization of deposition parameters and TFT fabrication technique could lead to better device performance with greater field effect mobility and higher on/off current ratio.

Keywords — ZnO, thin films, Optical, microstructural, TFT

I. INTRODUCTION

ZnO is a well-known material and is studied worldwide for its versatility in the field of thin film microelectronics, optoelectronics and as active material for sensors. Owing to its large wide direct band gap and large excitonic binding energy (about 60 mev) it finds ample scope of utility in optoelectronic devices including light emitting diodes, laser diodes, photo detectors etc, whereas due to its high stability in harsh conditions and capability to withstand large voltages, it also finds application in the field of high voltage microelectronics. The application of ZnO as piezo actuators and as gas sensors is also well reported. However, foremost criterion for application of ZnO thin films into microelectronic devices is its viability in fabrication of good quality thin film transistors. Since TFTs are the fundamental component of all microelectronic devices, including memory devices and microprocessors, flexible transparent displays, bio-electronic tagging, and other biomedical applications [1,2]. Key to this is the integration of any new material technology with the existing Si technology. Shin *et al.* [3] recently reported on a low temperature solution processed ZnO field effect transistor (FET) by blending zinc hydroxide and zinc oxide nanoparticles in ammonium solution. By using the above method, they successfully improved the electrical performance of the transistor. They obtained highest electrical mobility of 0.201 $cm^2V^{-1}s^{-1}$ and current on/off ratio of 10^6. Ruzgar *et al* [4] discussed in a recent communication, the effect of tin (Sn) doping in solution based preparation of ZnO thin film transistors on p-Si substrate with a thermally grown SiO_2 layer. They reported the best result with 10% Sn doped ZnO TFT with field effect mobility of 3.83 $cm^2V^{-1}s^{-1}$ and current on/off ratio of the order of 10^8. Bang et al. [5] reported the effect of Li doping of ZnO thin film for TFTs. From their study they concluded that Li doping improved the performance of ZnO TFT. They observed the highest mobility at a Li concentration of 0.5 mol% in ZnO. The current on/off ratio also increased significantly. Babu et al. [6] also recently reported on the study of pulsed laser deposition (PLD) deposited ZnO TFT. They deposited crystalline ZnO as channel and used amorphous ZnO as gate dielectric and demonstrated promising results.

II. PROCEDURE

In this context, we report here the deposition and characterization of ZnO thin films and TFT fabrication using SiO_2 coated p+-Si substrates.

The ZnO films were deposited on quartz and SiO_2 coated p+-Si substrates by laser ablation technique (pulsed laser deposition). All the depositions were carried out with the 1064 nm principal line of an Nd: YAG laser, operated at 10 mJ pulse energy, having a pulse of width of 5 ns @ 10 Hz frequency. Out of the several physical vapour deposition techniques for deposition high resistive thin films, laser ablation is a very versatile procedure for ensuring uniform thin film with excellent physical and morphological characteristics by controlling the deposition parameters. During the laser ablation process, high intensity, short bursts of laser beam pulsed at a chosen frequency incident

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 Tirthankar Choudhury Page 34 of 210

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Study of SiO_x insulating layer for integration with Si technology

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Abstract: **Laser ablation procedure was utilized to deposit Silicon suboxide (SiO_x) thin films on c-Si and glass using a silicon monoxide (SiO) target of 99.99% purity. The ablation was carried out with the principal line of 1064 nm wavelength of a pulsed Q-switched Nd:YAG laser. The pulse energy was 10 mJ/cm^2 and was incident upon the target with a frequency of 10 Hz. The substrate temperature was varied from 300 K to 873 K. This yields transparent thin films. The optical, microstructural and electrical characteristics of the as deposited films were studied. X-ray induced Photo-electron Spectroscopy (XPS) was used to determine the composition of the thin films. The film deposited at 300 K had the maximum oxygen content. The oxygen content decreased with the increase in substrate temperature. The optical constants of the SiOx films were obtained from modified Kramer-Kronig model. An Al/SiO_x/p-Si metal-insulator-semiconductor (MIS) structure was fabricated and its capacitance-voltage characteristics was studied.**

Keywords — c-v, electrical, laser ablation, MIS, optical, SiO_x

I. INTRODUCTION

Sub-stoichiometric silicon oxide, SiO_x ($x \leq 1.6$) thin film has in the recent years garnered much interest in the research community due to its immense application as passivation layer which helps stave the high recombination rate in c-Si solar cells, to reduce drastically the optical reflectance and use in battery technology [1-7]. It also commands repute for use as active layer in Si based microelectronics, especially in memory devices. SiOx based resistive switching memory devices has also come into fore due its simple fabrication process and excellent performance. Mehonic et al. [8] in a recent communication, demonstrated that the conductance of Si rich silica (SiOx) resistive switches is intrinsically quantized in half integer multiple of G_0, the fundamental unit of conductance. It has been further demonstrated that unlike other resistive switching systems, this quantization is not due to drift metallic ions. In CMOS processing, this diffusion of metallic ions is not desirable. This is what makes the intrinsic switching of SiO_x so much more appealing [9]. The commercial introduction of resistive switching memory elements, notably memristors could potentially solve the issue of charge control as the memory devices are scaled to lower physical dimensions. It could in future replace RAMs, flash drives and hard disks as the universal non-volatile memory. In this context we present here the microstructural, optical, compositional and electrical characteristics of SiO_x thin films deposited at various substrate temperatures using laser ablation technique to better understand the material characteristics for microelectronic device applications.

II. PROCEDURE

SiO_x thin films were deposited onto glass substrates and crystalline p-Si substrates with thickness of 200 nm by laser ablation process using a SiO target (Sigma Aldrich, 99.99% purity). The 1064 nm fundamental line of a Q-switched Nd:YAG laser with pulse duration of 10 ns and 10 Hz repetition rate (10 mJ/cm^2 pulse energy) was incident directly onto the SiO target, through a quartz window. It ablated the target material. When the laser pulse of Nd:YAG is incident upon the SiO target, it melts and evaporates the target material. The target material also ionizes and travels within the luminous plasma plume formed inside the chamber, which expands away from the target towards the substrate. Upon reaching the substrate, the deposition material contained within the plume condenses and forms a thin layer on top of the substrate. In principle, laser ablation is a very versatile technique for deposition of thin films with large degree of control over the film stoichiometry, thickness and uniformity. In our case, the target to substrate distance was 3 cm. The deposition was carried out for 15 minutes duration. Before the deposition, the stainless steel laser ablation chamber was evacuated to 10^{-5} mbar pressure. During the deposition, the background oxygen pressure was kept fixed. The substrate temperature was varied at 373K, 473K and 673K, to obtain films with different oxygen content.

112 Soumya Ranjan Bhattacharyya

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Fabrication and characterization of transparent nanocrystalline ZnO thin film transistors by a sol–gel technique

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Abstract. A nanocrystalline zinc oxide (ZnO) thin film-based metal–insulator–semiconductor thin film transistor (MIS TFT) was fabricated by a facile sol–gel technique onto silicon di-oxide/indium tin oxide-coated glass substrates. The microstructural study of the ZnO thin films indicated uniform crystalline growth with typical (002) X-ray diffraction peaks for h-ZnO with a wurtzite structure. The optical transmittance of the ZnO thin films was >80% in the visible region of the electromagnetic spectrum. The field effect transistor (FET) aluminium top contacts were fabricated using suitable shadow masking. The transfer characteristics of a typical ZnO MIS FET revealed nonlinearity in a linear plot. From the slope and crossover, we obtained a first estimate of field effect mobility (μ) and threshold voltage (V_T) of 0.13 $cm^2\ V^{-1}\ s^{-1}$ and 1.03 eV, respectively. The ZnO TFT operated in enhanced mode with n-channel characteristics and the drain current on–off ratio was 10^5. The deposition parameter needs to be optimized to obtain TFTs with a higher modulation ratio and larger field-effect mobility.

Keywords. Zinc oxide; sol–gel; thin film transistor; optical; electrical.

1. Introduction

Thin film transistors (TFTs) are the basic building blocks for microelectronic components that include memory devices, optoelectronic devices and processors since the control electrodes of transistors are responsible for various useful operations like amplification, memory, logic operations, etc. The advent of transparent TFTs could potentially revolutionize the field of electronics, optoelectronics and spintronics, especially for devices with flexible displays and electronic banners, wearable electronics and microelectronic tagging, and biological and medical applications [1]. However, the marketability of transparent TFT devices would depend on the quality of the active semiconductor layer, and the related device parameter optimization. In this regard, zinc oxide (ZnO) is an excellent material of choice for the fabrication of transparent TFTs due to their higher field effect mobility as compared to a-Si and lower deposition temperatures as compared to polycrystalline Si [1]. For better performances of TFTs, both the values of the field effect mobility and on–off ratio should be higher.

Among the various techniques for producing ZnO thin films, having their own merits and demerits, this wet-chemical technique offers a facile method to obtain good quality transparent nanocrystalline ZnO thin films at a relatively low thermal budget. There are several reports of ZnO-based field effect transistor (FET) being fabricated by using a wet chemically deposited ZnO layer. Shin *et al* [2] reported the fabrication of a low temperature solution processed zinc oxide FET by blending zinc hydroxide and zinc oxide nanoparticles in aqueous medium with a field effect mobility between 0.037 and 0.201 $cm^2\ V^{-1}\ s^{-1}$. The on–off ratio was varied between 10^4 and 10^6. Hoffmann *et al* [3] also reported on the ZnO nanoparticle FET device performance. Their devices exhibited a mobility of 10^{-2}–10^{-3} $cm^2\ V^{-1}\ s^{-1}$. There are also other repoets on the ZnO nanostructured FET [4–6]. However, in general, the electrical performance of the FET's is often hindered by poor interface quality with low carrier mobility. Therefore, the deposition of a high quality ZnO thin film at a relatively low thermal budget and optimization of device parameters to optimize the performance of the TFTs are still a challenge to the researchers. In this context, we present here, the results obtained from TFTs fabricated by chemically derived ZnO thin film layers deposited on top of silicon di-oxide/indium tin oxide (SiO_2/ITO)-coated glass substrate. Nanocrystalline ZnO-based TFTs are fabricated by using these ZnO thin films, where SiO_2 and ITO act as the gate insulator and gate electrode, respectively.

2. Experimental

The nanocrystalline ZnO films were deposited on SiO_2/ITO-coated glass substrates and quartz substrates with a dimension of 1 cm^2. For deposition of the SiO_2 layer, commercially available ITO-coated glass (Sigma, Aldrich) with a surface

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Characterization of a tea pest specific *Bacillus thuringiensis* and identification of its toxin by MALDI-TOF mass spectrometry

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ABSTRACT

Tea, *Camellia sinensis* (L.) O'Kuntz is a cash crop, cultivated in tropical and subtropical climatic countries throughout the globe. The tea ecosystem hosts several species of arthropods, of them many species attack different parts of tea plants during their growth phases resulting in huge economical loses. *Buzura suppressaria* (Bs), *Hyposidra talaca* (HT), *Hyposidra infixaria* (HI) are members of order *Lepidoptera,* which are the most notorious tea pests, found in North-East India and make huge destruction of tea plantation due to their voracious eating habit and short life span. A potent indigenous strain of *Bacillus thuringiensis* (Bt) against the tea looper (TL) was isolated from Danguajhar Tea Garden, Goodricke Group Ltd. India, and characterized based on morphological, biochemical and genetic traits (16S rRNA gene NCBI GenBank Accession. No. JF966358). Virulence assay, to itemize the entomopathogenic nature of Bt against TL, was determined in laboratory and field conditions to enumerate its LC50 (1.11×10^7 spores/mL) and LT50 (54.64 h) values with a TL mortality rate of 99.43% in field. For large scale production, Bt was screened with four different mediums (based on barley, wheat, rice flour and nutrient broth) and was found to produce a maximum of 4.6×10^7 spores/mL, when barley was considered as a sole source of carbon. Highly expressive sporulation associated toxins was identified as an immune inhibitor A of Bt (NCBI Accession No.gi|9858110|AAG00998.1) by MALDI-TOF mass spectrometry which is an extracellular bacterial protein known for putrefaction of host tissue proteins with a wide-range of substrate specificity. The results were quite encouraging which can be adapted as a greener way of pest control.

1. Introduction

Tea, *Camellia sinensis* (L.) O'Kuntz an economically important aromatic beverage, mainly cultivated in China (2,095,570 tonnes per annum), India (1,207,310 tonnes per annum), Kenya (445,105 tonnes per annum), Sri Lanka (338,032 tonnes per annum), and other tropical and subtropical countries (Vietnam, Turkey, Iran, Indonesia, Argentina, Japan etc.), mostly for leaves (data was generated using database of Food and Agriculture Organization of the United Nations, up to 2014. http://www.fao.org/faostat/en/#data/QC, Accessed on 26th October 2018; Supplementary Table 1). It is presumed that the total estimated global market of tea worth 10.84 billion U.S. dollars (FAO, 2015). The permanent tea ecosystem hosts near about 82 species of nematodes and 1031 species of arthropods, of them 230 species of insects and pests attack different parts of tea plants during their growth phases in Asia resulting a huge economical loses (Hazarika et al., 2009). In various regions of India, tea production is mainly harmed by several pests like *Buzura suppresaria, Hyposidra talaca*, *Hyposidra infixaria*, *Andraca bipunctata, Polyphagozerra coffeae, Laspeyresia leucostoma, Caloptilia theivora, Gracilaria theivora, Macroplectra nararia, Parasa pastoralis, Thosea sinensis* etc (Roy and Muraleedharan, 2014a, b). To protect this crop from insect pests, some cultural (bush sanitation/cold weather practices, ground sanitation, balanced nutrition, soil rehabilitation before replanting, improved drainage, proper shade management, soil amelioration), mechanical and physical (hand collection, light trapping, pheromone trapping are practiced; source- www.tocklai.net/activities/tea-cultivation/pests/) operations. High dose of chemical pesticides are also used in commercial tea garden to control the pests which are having detrimental effects on natural enemies of pests thereby disturbing the biodiversity and the balance in the natural ecosystem. Additionally, use of these chemical pesticides causes several serious human health hazards like nausea, vomiting, headaches, dizziness,

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Research Article

PHYLOGENETIC RELATIONSHIP OF SOME SPECIES OF *ALLIUM* L. ON THE BASIS OF MORPHOLOGICAL, BIOCHEMICAL AND CYTOLOGICAL STUDY

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Allium, Bulb morphology, Dendrogram, Mitotic index, Nucleolus

ABSTRACT

Allium is the medicinally important one of the largest monocotyledonous genera. Taxonomic position of this genus remains controversial. Morphological markers alone are not adequate to achieve correct identification, interspecific relationship and proper taxonomic position of a taxon. In the present investigation, phylogenetic relationship among the four selected species of *Allium* (*A. cepa, A. sativum, A. hookeri* and *A. wallichii*) has been established through dendrogram analysis, based on some morphological, biochemical and cytological parameters. *A. cepa* and *A. hookeri* exhibited maximum and minimum bulb size and weight respectively, where as soluble root protein is higher in *A. hookeri* than rest of the three species. A comparative study based on nucleolar volume and mitotic index of *Allium* exhibited considerable variation. All the species exhibited mono and binucleolate cells. *A. hookeri* is only species which exhibits mono, di, tri and tetranucleolate cells. Largest nucleolus is observed in *A. hookeri* and smallest nucleolus is present in the cells of *A. sativum*. The *A. cepa* exhibits maximum mitotic index than the other species under study. Dendrogram analysis exhibits two hierarchical clusters- upper cluster (UC) and lower cluster (LC). *A. hookeri* is only placed in LC while the rest of the three species are placed in UC. UC has been again sub-divided into two sub clusters- UC1 and UC2. *A. cepa* and *A. wallichii* are included in UC1 while *A. sativum* is placed in UC2. Thus the present study provided useful information for the identification of the taxa, their relationship and delimitation of their taxonomic status.

INTRODUCTION

Allium L. is the largest monocotyledonous genus among the 900 world-wide distributed species (Keusgen *et al*, 2011; Govaerts *et al*, 2013; Borborah *et al*, 2014). The taxonomic position of *Allium* and related genera had been a matter of debate (Fritsch and Friesen, 2002). This genus was formally included in the family Liliaceae. Takhtajan (1997) placed the genus under the family Alliaceae, order Amaryllidales. But the Angiosperm Phylogeny Group system finally placed the genus under Amaryllidaceae family (APG, 2009). *Allium* L. has characteristic morphological features of underground storage organs comprising of bulbs and rhizomes. Majority of species of *Allium* L. are native to the northern hemisphere especially in Asia. A few species are native to Africa and Central and South America (Kamenetsky and Rabinwitch, 2006). Maximum diversity of *Allium* L. is found in North Eastern States of India, which include Assam, Meghalaya, Tripura, Manipur, Mizoram, Nagaland, Arunachal Pradesh and Sikkim. The warm tropical climate of this region provides the fruitful habitat for a wide diversity of both wild edible and cultivated species of *Allium* (Borborah *et al*, 2014).

The genus has nutritional as well as medicinal values. The onion (bulbs of *A. cepa* L.) is a popular vegetable consumed worldwide as raw and cooked forms. The garlic (*A. sativum* L.) is mainly used as a flavouring agent in food. *A. hookeri* is used as food like onion and it also used in ethnotherapy (Ayam, 2011). The young leaves of *A. wallichii* L. are cooked as a vegetable as well as the dried leaves are used as a condiment in curries and pickles. Most of the species of *Allium* have antimicrobial, anticancer, blood clotting properties, thus they are used in relieving cough, bronchitis, asthma, gastrointestinal disorders, headache and heart diseases etc. (Kumar *et al*, 2010). The chromosomes of *Allium* L. have been studied for decades for their diversity in number, size and morphology (Sharma and Aiyangar, 1961; Koul and Gohil, 1970; Konvicka and Levan, 1972; Gohil and Koul, 1980; Puizina and Papes, 1996; Fritsch, 2001). It was also reported that karyomorphologial diversity is associated with gross morphological differences in some species. The detailed comparative karyotype analysis of the

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Research Article

Groundwater quality assessment using multivariate statistical technique and hydro-chemical facies in Birbhum District, West Bengal, India

Niladri Das[1] · Prolay Mondal[2] · Ranajit Ghosh[3] · Subhasish Sutradhar[2]

Abstract

The assessment of quality of groundwater is an important issue in the present era of population growth, massive agricultural development, industrialization and urbanization. As the demand of groundwater increases, the quality becomes deteriorated. In this background, the study of groundwater quality in Birbhum District is very much important as this area has been characterized by diversified rock formations. For the analysis purpose, 14 parameters regarding the hydro-chemical data of groundwater, viz. P^H, electrical conductivity, total hardness, calcium, magnesium, sodium, potassium, bicarbonate, chloride, sulfate, fluoride, silicon dioxide, phosphate and iron, were selected. The present study has been carried out using multivariate statistical method, viz. principle component analysis (PCA) and cluster analysis. In addition, different hydro-chemical facies in terms of hydro-chemical diagrams have been used to show the present status of groundwater quality in the concerned area. The result of PCA, a multivariate statistical technique, reveals that it extracts five major factors accounting for 80% of the total variance. Fluoride has been extracted as first factor. It is because the western part of the district has been characterized by highly fluoride contaminated area where basaltic terrain is present. The study also shows concentration of cation and anion that are present in the order of $Na^+ > Ca^{2+} > Mg^{2+} > K^+ = Cl^- > HCO^{3-} > SO_4^{2-}$. Two clusters have been prepared: one for sample villages and another for chemical components. Sample village-wise cluster reveals that Baidyanath, Muluk, Khayrasole, Md Bazaar, Patel Nagar, etc. bear same chemical characteristics, while chemical component cluster shows the homogeneous grouping among P^H, PO_4, Sio_2, Fe. Diagrammatic presentation of chemical parameters is also an important aspect in this study. Here application of Wilcox diagram basically depicts the nature of water for the suitability of irrigation. It shows that about 50% samples out of total sample have been characterized by excellent to good, the rest 25% samples present in good to permissible category, 20% are under the category of permissible to doubtful and 5% belong to the category of doubtful to unsuitable, while Gibbs mechanism displays 68% samples belonging to the category of rock dominance and the rest 32% in precipitation dominance category. This kind of study obviously demand an important space as groundwater quality is directly related to human health. So, for the sustainable development of human health, this type of study opens a new dimension for the betterment of the society and the concerned region.

Keywords Groundwater quality · Multivariate statistical analysis · Hydro-chemical facies

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أهمية النظم في فهم القرآن

- الأستاذ نسيم ظهير الإصلاحي الغازي[1]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

إن نظم الكلام يكون جزءًا من الكلام لا ينفك عنه فلا يمكن تصور كلام بدونه،[3] فإن القرآن الكريم الذي يعدّ إعجاز الفصاحة والبلاغة وإنه معجز في الحقيقة والذي قد غيّر دنيا الأذهان والقلوب وأسّس الفكر والعقل وأعطى الإنسان شيئًا جديدًا، فلن يصحّ التصور عنه أبدًا أنه خالٍ من النظم، فلذلك نقل العلامة بدر الدين الزركشي قول الشيخ كمال الدين الزملكاني:

"فما ظنّك بالآيات وتعلّق بعضها ببعض! بل عند التأمل يظهر أنّ القرآن كلّه كالكلمة الواحدة."[4]

وكذلك يكتب ناقلًا قول بعض المشايخ:

"قال بعض مشايخنا المحققين:..... ومن المعجز البين أسلوبه، ونظمه الباهر؛ فإنه "كِتَٰبٌ أُحۡكِمَتۡ ءَايَٰتُهُۥ ثُمَّ فُصِّلَتۡ مِن لَّدُنۡ حَكِيمٍ خَبِيرٍ ۝١"[5]. "قال: والذي ينبغي في كل آية أن يبحث أول كلّ شيء عن كونها مكملة لما قبلها، أو مستقلة. ثم المستقلة؛ ما وجه مناسبتها لما قبلها؟ ففي ذلك علم جمّ".[6]

---

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[5] سورة هود: 1

[6] المصدر نفسه، ص 38

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Research Article

DEPOSITION AND CHARACTERIZATION OF ZnO NANONEEDLES BY FACILE SOLUTION PROCESS

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ABSTRACT

ZnO nanoneedle clustered thin film with individual needles of length of 1000-1500 nm and diameter of around 100-200 nm were deposited on top of ZnO buffer layer coated indium doped tin oxide (ITO) glass substrate and quartz substrate by a facile solution process which is both cheap and has a low thermal budget. The microstructure of the as deposited thin films were characterized by scanning electron microscopy (SEM), whereas the x-ray diffraction (XRD) was used to determine the crystal structure in these nanoneedles. The optical characteristics of the thin films were obtained by determining the optical transmittance of the films at room temperature. The ZnO nanoneedle thin films had a bandgap of about 3.21 eV. The photoluminescence (PL) spectra obtained at room temperature confirmed the presence of defects related luminescence characterized by the broad PL peak centered at 2.1 eV.

Keywords: ZnO, Nanoneedle, Thin Film, SEM, PL.

1. INTRODUCTION

One-dimensional ZnO nanostructures are technologically very important due to their potential application in various sensors, optoelectronic devices [1-5]. The ZnO one-dimensional nanosystems could be used as both active and passive elements in nanoelectronic circuit, which could provide direct path for the flow of carriers. The piezoelectronics property of the ZnO 1d nanostructures could also be utilized for energy harvesting where, power could be generated by simple application of stress on the nanosystems [6, 7]. Owing to the easy availability, low cost and ease of deposition of the ZnO one-dimensional nanosystem onto a wide range of substrates, they prove to be a viable option for the electronic industry to replace the traditional electronics towards the goal of transparent, flexible electronics [8-10], which is more suitable for modern applications under harsh working condition. In this communication, we report on the deposition and characterization of ZnO one dimensional nanoneedle cluster thin film by a simple solution process that is both facile, low cost and has a low thermal budget. The films were deposited on a ZnO buffer layer coated ITO coated glass for potential application as electrode in dye-sensitized solar cells. SEM was utilized to observe the microstructure of the deposited thin films. The crystal structure and orientation was studied by XRD (using the Cu Kα line of wavelength $\lambda = 1.54$ Å). The optical characteristic of the film was studied by measuring its transmittance spectra at room temperature using an UV-VIS-NIR spectrophotometer in the wavelength range of λ =300-800 nm. The transmittance versus wavelength data was used to compute the optical absorption coefficient of the ZnO nanosystem and hence its bandgap was also obtained. The PL spectrum of the ZnO nanoneedle thin film was obtained using a dual channel lock-in amplifier.

2. MATERIAL AND METHOD

ZnO nanoneedle cluster thin film was deposited by a facile solution process; onto an ITO coated glass substrate (Sigma Aldrich) of sheet resistance of 25 Ω/sq and fused silica substrate. Prior to deposition, the ITO coated glass and fused silica substrates were subject to rigorous cleaning process. Firstly, substrates were rinsed in deionized distilled water and then subject to ultrasonciation in an ethanol bath. This process removed any grease or dirt on the top of the substrate. These cleaned substrates were used for the deposition of the ZnO nanoneedle cluster thin films. In the first step, a 50 nm thin ZnO buffer layer was deposited by wet chemical process. In this step, 0.4M zinc acetate was dispersed in ethyl alcohol and 1:1 molar ratio of diethanolamine was added to it and stirrer continuously in a magnetic stirrer

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Short Communication

FABRICATION AND CHARACTERIZATION OF Al DOPED ZnO THIN FILM BY PVD TECHNIQUE

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ABSTRACT

ZnO thin films were deposited onto quartz substrates at room temperature by dc sputtering of a ZnO target. Al was thermally evaporated onto the ZnO thin films in an evaporation chamber, with the thickness of the Al layer being monitored using a thickness monitor. To achieve Al doping, the Al coated ZnO thin films were then rapid thermal annealed at 773K for 1 minute. This helped in incorporating Al within the ZnO lattice. The amount of Al doping in the ZnO thin films was verified by energy dispersive x-ray analysis (EDAX). Scanning electron microscopy (SEM) of the Al doped ZnO (AZO) samples indicated excellent surface coverage with compact smooth film and x-ray diffraction (XRD) confirmed the hexagonal crystal growth with wurtzite structure. The optical transmittance of the thin films showed appreciable transparency of the thin films in the visible range. The optical constant and the thickness of the thin films were determined by a modified Kramers Kronig approach. Dark conductivity measurement indicated decrease in resistivity of the sample with the increase in Al doping, while the conductivity increased.

Keywords: ZnO, Al, Doping, Optical, Conductivity

1. INTRODUCTION

Al doped ZnO is an important transparent conducting oxide (TCO) material [1-3] with potential for application in transparent electronic, optoelectronic and sensor devices [4-6]. ZnO being a wide direct band gap material, having high excitonic binding energy of 60 meV, appreciable piezoelectric property, resistance to harsh environment, it is versatile enough by itself, to demand a lot of attention from researchers worldwide [7, 8]. However, with Al doping in ZnO, several properties including the conductivity of the ZnO samples can be modulated effectively according to requirement. Hence, AZO provides an attractive proposition for the TCO community to study in details [9-11]. Especially since Al is so easily available at relatively nominal cost but to put AZO into device application one has to have in-depth knowledge regarding the change in optical and electrical properties of ZnO caused by Al doping. In this communication, we report on the deposition of Al doped ZnO (AZO) by physical vapor deposition technique. Here, the ZnO layer is first deposited by dc sputtering technique onto quartz substrates. Then pre-determined thickness of Al was evaporated onto the ZnO thin film and was subject to rapid thermal annealing to dope the ZnO thin film with 1%, 3% and 4% of Al.

The Al doping in the ZnO thin films was verified by energy dispersive x-ray analysis (EDAX). The microstructure of the AZO thin films were examined by SEM and XRD, while the optical characteristics of the AZO films were studied by obtaining the transmittance trace at room temperature in the wavelength range of λ =300-800 nm using an UV-VIS-NIR spectrophotometer. From the transmittance spectra, the band gap, optical constants- including the refractive index (n), extinction coefficient (k) and the thickness of the thin films (d) were determined by a modified Kramers-Kronig model (KK model) [12]. The dark conductivity of the AZO thin films was also measured at room temperature to observe the change in conductivity of the films due to incorporation of Al.

2. MATERIAL AND METHODS

ZnO thin films were deposited onto quartz substrate at room temperature, by dc sputtering technique. Before the deposition, the sputtering chamber was evacuated to a base pressure of 10^{-5} mbar by rotary pump and oil diffusion pump combination. The target used was pure ZnO (Sigma Aldrich, 99.99% pure). The target to substrate distance was kept at 5 cm. Deposition was carried out in Ar plasma at a system pressure of 0.025

Soumya Ranjan Bhattacharyya 96

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Vertically Aligned Al-Doped ZnO Nanowire Arrays as Efficient Photoanode for Dye-Sensitized Solar Cells

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In this communication, we report on the synthesis of vertically aligned aluminium (Al)-doped ZnO (ZnO:Al) nanowire (NW) thin films on FTO-coated glass substrates and their use as photoanode in dye-sensitized solar cells (DSSC). Very thin Al layers (~3 nm, ~6 nm and ~10 nm) were deposited onto chemically synthesized ZnO nanowire film by electron-beam evaporation. The films were then subjected to rapid thermal annealing to incorporate different amounts of Al (~0.98 at.%, 1.94 at.% and ~2.89 at.%) into the ZnO nanowires. Optical, microstructural and compositional study of the films confirmed the growth of highly transparent and well-aligned ZnO:Al nanowires with a hexagonal crystal structure. The basic DSSC structure was fabricated using both undoped ZnO nanowire and ZnO:Al nanowire thin films as photoanode. In both cases, commercially available N3 dye was used as a photosensitizer, iodide/tri-iodide solution as electrolyte and FTO-coated glass as counter electrode. A significant increase in short-circuit current was observed, from 1.3 mA cm^{-2} for the pristine ZnO nanowire film-based DSSC to 4.4 mA cm^{-2} for the ZnO:Al (2.89 at.%) nanowire film-based DSSC. The overall power conversion efficiency (PCE) was also found to increase from 0.13% (for pristine ZnO nanowire thin film) to 0.49% for the ZnO:Al thin film-based DSSC.

Key words: ZnO nanowires, aluminium, thin film, DSSC

INTRODUCTION

One-dimensional (1D) zinc oxide (ZnO) nanostructures have been at the forefront of research in the past few decades due to their unique electronic and optical properties which make them suitable for application in optoelectronic, piezoelectric and sensing devices.[1–4] Recently, there has been much interest in the application of ZnO NW arrays as photoanodes in dye-sensitized solar cells (DSSC), mainly due to their reproducible, facile and low-temperature deposition method, as well as low toxicity, direct wide band gap (3.3 eV at room temperature) and high excitonic binding energy (60 meV). Moreover, the nanowire geometry provides direct pathways for photo-generated charge carriers to transport from the point of injection to the collecting electrode through the nanowire axis with higher electron mobility and less recombination possibility.[5,6]

Giannouli et al.[6] recently reported a study on the factors affecting the performance of ZnO NW-based DSSC deposited by a wet chemical technique. They obtained a power conversion efficiency (PCE) of 0.63% for the nanowire-based DSSC. Tanaka et al.[7] reported on the structural improvement of solution-processed ZnO electrodes to increase the open-circuit voltage (V_{oc}) of the DSSC. By decreasing the Zn concentration in the chemical bath, a thick quasi-monolayer structure was deposited, which helped to increase the open-circuit voltage of the cell to 0.807 V. The power conversion efficiency of the cell also increased significantly with the increased thickness of the monolayer films. Other

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Soumya Ranjan Bhattacharyya

Annex-17C

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ON THE UNIQUENESS THEOREMS OF L-FUNCTIONS CONCERNING WEIGHTED SHARING

NIRMAL KUMAR DATTA AND NINTU MANDAL[1]

ABSTRACT. We mainly study the properties of L-functions using Nevanlinna value distribution theory in the extended selberg class. In this paper, we investigate the relationship between meromorphic functions and L-functions concerning weighted sharing with the help of Nevanlinna value distribution theory. We prove a uniqueness theorem of a meromorphic function and an L-function when they share $(0,0)$ and $(1,1)$. We also get valuable information about the counting of the zeros of L-functions. The results of this paper improve some recent results of W. J. Hao and J. F. Chen [1].

1. INTRODUCTION

L-functions play very important role in the modern number theory. One common thing is that all the L-functions can be described by an Euler product. So all the L-functions can be described as a product taken over prime numbers. Considering unique prime factorization of integers we can represent L-functions as Dirichlet series. We may regard the famous Riemann zeta-function, $\zeta(z) = \sum_{n=1}^{\infty} 1/n^z = \prod_p (1 - 1/p^z)^{-1}$ where $z = \sigma + it$, $\sigma > 1$ and p denotes prime number and the product is taken over all prime numbers, as the prototype. We can get valuable information on the algebraic structure from the value distributions of the L-functions which is not obtainable by the elementary algebraic method. In particular, the distribution of zeros of L-functions is of special

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85

Nirmal Kr. Datta

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ندوة علمية دولية

حول

"تاريخ مدرسة الإصلاح"

إعداد: د. محمد معتصم الأعظمي[1]

عقدت مدرسة الإصلاح بسرائ مير (أعظم كره، ولاية أوترابراديش، الهند) ندوة علمية دولية حول موضوع "تاريخ مدرسة الإصلاح"، استمرت لمدة ثلاثة أيام. وتلك في 2-4 من شهر أكتوبر، 2019م. حضر هذه الندوة عدد كبير من العلماء والباحثين كما حضرها عدد غير قليل من أهالي المحافظة والمتخرجين في مدرسة الإصلاح. قدّم فيها أكثر من خمسين باحثًا مقالاتهم بالأردوية والعربية، وقاموا بالبحث عن تاريخ مدرسة الإصلاح وأفكارها التعليمية وتركيزها على الدراسات القرآنية ومساهمتها في المجالات المختلفة؛ الدين والسياسة والثقافة والاجتماع والأدب. وقد اشتملت هذه الندوة على ثماني جلسات علمية وكانت ناجحة للغاية. ولم يألُ منسّق الندوة والمسؤولون عن المدرسة أي جهد لخدمة المحاضرين من العلماء والباحثين القادمين من مختلف ربوع الهند وخارجها. جزاهم الله خير الجزاء.

بدأت الندوة بتلاوة آي من القرآن الكريم تلاها الشيخ محمد عمران الإصلاحي مدرّس في مدرسة الإصلاح ثم أنشد عبد الله مظهر أحد طلابها قصيدة في المديح النبوي ثم قدّم محمد أشرف ورفقاؤه (طلاب مدرسة الإصلاح) نشيد المدرسة، ترأس هذه الجلسة السيد محمد أبرار الإصلاحي المكي رئيس منظمة الطلاب الأقدمين ونسّقها الشيخ محمد عمر أسلم الإصلاحي أستاذ التفسير في المدرسة ثم ألقى منسّق الندوة الأستاذ نسيم ظهير الإصلاحي كلمات الترحيب بجميع

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A lanthanide doped metal-organic framework demonstrated as naked eye detector of a trace of water in organic solvents including alcohols by monitoring the turn-on of luminescence

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ABSTRACT

It is very crucial to have a very simple, instant and low-cost detection and estimation of a trace of water in common organic solvents including alcohols. To obtain the sensor material we have synthesized a metal-organic framework (MOF) $\{[Y_{1.0}Mn_{1.5}(PDA)_3(H_2O)_3]\cdot 3.5H_2O\}$, **1**, (PDA = 2,6-pyridinedicarboxylic acid) through hydrothermal process. A doping of compound **1** by 10 % terbium $\{[Y_{0.9}Tb_{0.1}Mn_{1.5}(PDA)_3(H_2O)_3]\cdot 3.5H_2O\}$, **1:Tb**, was done through an isomorphous substitution technique. The most advantageous point about **1:Tb** was the metal centre luminescence, which was largely stokes shifted from the excitation light making possible the naked eye observation. The weak metal centre luminescence intensity of dehydrated **1:Tb** (excluding lattice and co-ordinated water molecules) in organic solvents EtOH, CH_3OH, CH_3CN, THF and n-heptane showed huge turn-on in presence of trace amounts of H_2O in the said solvents. The luminescence intensity of Tb^{3+} centre was enhanced by several folds with a limit of detection 1.12 %(v/v), 0.47 %(v/v), 0.04 %(v/v), 0.13 %(v/v) and 0.53 %(v/v) respectively. The coordinated water molecules as well as the lattice water molecules in **1:Tb** play a vital role during sensitization of the Tb^{3+} centre by enhancing the rigidity of the structure and facilitating the formation of LMCT state which ultimately results in a huge turn-on of metal centre luminescence.

1. Introduction

Most of the organic solvents are frequently contaminated by a trace amount of water. The dry products, moisture sensitive chemicals, oils and petroleum products often contains water as impurity [1,2]. It is very important to detect and estimate the amount of water in solvents, fuels and most importantly alcoholic beverages [3–6]. In the laboratory, the existence of water decreases the reactivity in organic solvents, increases the formation of oxidation products, lowers the yield of reactions or sometimes fires and explosions comes out in some chemical reactions [7]. So, a good sensor of water in organic solvents is of high significance in the field of analytical chemistry, chemical industries, pharmaceutical industries and for scientific applications [8–11].

For the estimation of amount of water in organic solvents a widely used technique is Karl Fischer titration [12,13]. However, such method has several disadvantages for practical applications due to the requirement of specialized instrument, unpleasant pyridine-based reagent, long time consumption, complicated procedure and requirements of well trained personnel [14]. Colorimetry [15,16], electrochemistry [17], gas chromatography [18], luminescence [19–21] etc. are the various detection techniques employed for detection of water till date. Among them, luminescence sensors have attractive attention because of several reasons. It requires only a small amount of sensor (chemical) for detection, the process is extremely easy and can be done instantly, it is highly sensitive method and can give very accurate results. It can be a widely applicable method because several aspects of luminescence like intensity, peak position, lifetime etc. can be monitored for the detection depending upon the sensor and analyte pair. Most importantly it is cost effective and reliable method [22,23]. So, luminescence-based sensors are ideal alternative for Karl-Fischer titration method [3].

In the literature, there have been reports of various materials such as copper nanoclusters [24–26], conjugated polymer [27,28], fluorescent

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Eco-friendly Management of Mealy Bug (*Maconellicoccus hirsutus* Green) on Som Plant (*Machilus bombycina* King) using Bio-pesticides

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ABSTRACT

A field experiment was conducted under Uttar Banga Krishi Viswavidyalaya at Pundibari, Coochbehar, West Bengal, India to study seasonal occurrence of mealy bug (*Maconellicoccus hirsutus* Green) on som plant (*Machilus bombycina* King) and its management using bio-pesticides. The mealy bug was active throughout the year. The peak population of mealy bug (18.68/3 leaves) was recorded on 10th standard meteorological week i.e. on 2nd week of March. Correlation co-efficient (r) study between pest population with environmental parameter showed that there was significant positive (+) correlation with temperature difference and significant negative (-) correlation with temperature (minimum and average) and relative humidity (maximum, minimum and average). On the other hand, non-significant negative (-) correlation found between mealy bug population and maximum temperature. Bio-efficacy of different treatments against mealy bug showed that Imidacloprid (CONFIDOR 17.8 SL) 1 ml/ 5L was found superior for management of mealy bug (77.39% reduction of mealy bug population) followed by Azadirachtin (NIMARIN 1500 ppm) 2.5 ml/L (57.38% reduction of mealy bug population). However botanical extract of tobacco 50.00 ml/L (5%) (50.48% reduction of mealy bug population), Garlic 50.00 ml/L (5%) (48.73% reduction of mealy bug population), Spilanthes 50.00 ml/L (5%) (45.40% reduction of mealy bug population), polygonum 50.00 ml/L (5%) (40.91% reduction of mealy bug population) and Pongamia 50.00 ml/L (5%) (30.37% reduction of mealy bug population) were found satisfactory to manage the pest.

Key words: Abiotic factors, Botanical extracts, Mealy bug, Organic cultivation, Seasonal occurrence

Mugu silk worm (*Antheraea assama* Westwood) primarily feeds on Som (*Machilus bombycina* King) plant (Bhattacharya *et al.* 1993, Tikader and Rajan 2012). The plant is very prone to attacked by different type of insect pests like gall insect, stem borer, leaf defoliating beetle, aphid, leaf miner, leaf roller, red tree ant etc. (Borgohain 2015). Kumar *et al.* (2011) found that som plant is infested by shoot borer, trunk borer, leaf miner, leaf gall and mealy bug. Due to attack of insect-pests it becomes difficult for the farmers to conduct silk worm rearing (Singh *et al.* 2000). Application of insecticides for the insect-pests control is not advocated as their residual effects is harmful for the silk worm (Subharani and Jayaprakash 2015). Botanical insecticide like onion, garlic, zinger, custard apple, turmeric, chrysanthemum, neem, pongamia, tobacco etc. have used for the management of insect-pest in sericulture (Singh and Sarathchandra 2005). Ghosh and Senapati (2002) reported that Azadirachtin / neem found moderate control of flea beetle (41.70%) on eggplant in terai region of West Bengal, India. Azadirachtin and extracts of Polygonum were found moderate to higher flea beetle control, recording more than 50% mortality (Ghosh 2014). *Polygonum*, locally known as "Biskanthali" (Sarkar and Mukherjee 2005) and its crude leaf and flower extracts of *Polygonum hydropiper* are responsible for mortality of *Heterotermes indicola* and *Coptotermes heimi* (Badshah *et*

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Assessment of variation of land use/land cover and its impact on land surface temperature of Asansol subdivision

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ABSTRACT

Economic development is a basic need for the growth of the region and it stimulates the rapid transformation of land use and land cover (LULC) units. Urbanization and industrialization are one of the major factors to increase temperature. Asansol sub-division is one of the important industrial and urbanized regions of eastern India. In this study, two different years viz. 1993 and 2018 have taken for the preparation of LULC and land surface temperature map. The kappa coefficient has been implied in this investigation to assess the accuracy of LULC maps. Temperature maps show that summer and winter surface temperature increases at the rate of 0.15 °C and 0.19 °C per year respectively. The result also reveals that temperature mainly increases due to the presence of urban, industrial and coal mine areas. The changing land use and land cover patterns show that the coal mine areas have been increased by 15% and urban areas also increased by 60%. Some correlations have been prepared to show the relationship between Land Surface Temperature (LST) and other spatial indices like NDBI, NDVI, and NDWI, where negative correlation prevails between LST and NDVI also with NDWI, but positive relation exists between LST and NDBI. Lastly, simulation of temperature for the year 2041 has been prepared, which shows that in the upcoming years' temperature may be increased up to 0.21 °C/year.

1. Introduction

For proper identification of a region, Land use and Land cover (LULC) is one of the most vital parameters for the proper identification of a region (Rousta et al., 2018). Rapid transformation from pervious surface to impervious surface through LULC changes has a great impact on local as well as regional environment (Rousta et al., 2018; Zhou et al., 1998). So, the formation of urban heat islands is the most important striking feature of rapid urban and industrial growth in the present era of development (Ranagalage et al., 2018). Buildings, roads, industrial farms, etc. are considered as the impervious surface, which can absorb shortwave incoming solar radiation in one hand but on the other hand, it leads to a reduction in the outgoing longwave terrestrial emission (Ranagalage et al., 2018).

Several studies established that there is a strong influence of LULC on surface temperature and reported that the relative rise in LST depends on LULC change especially in the urban centers (Pal and Ziaul,2017; Weng et al., 2004). Extension of agricultural land, the concretization of the open land, squeezing of surface water area, depletion of groundwater resources (Das and Mukhopadhyay, 2018), reduction of green vegetation area completely changes the existing environment (Zhang and Huang, 2015; Mahato and Pal, 2018). The negative effect of these kinds of change directly related to health risks & environment (Pal and Ziaul, 2017; Choudhury et al., 2019).

Remote Sensing and geospatial technology are some of the major modern tools for the identification of LULC and extraction of land surface temperature (LST) (Choudhury et al., 2019). Therefore, using both of these technologies, we can properly explain LULC changes as well as to extract the difference in land surface temperature (Hathout, 2002).

This paper attempt to identify the research objectives: (1) To detect the LULC changes over the last 23 years (2) To assess the Spatial as well as the temporal variation of surface temperature

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ORIGINAL ARTICLE

Application of DRASTIC model for assessing groundwater vulnerability: a study on Birbhum district, West Bengal, India

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Abstract
Groundwater is one of the important necessary renewable resources of the world. Without water, no life can be possible on this earth. It is not only sustaining all biotic elements of the earth but also it helps to fulfill the requirement of various sectors like agriculture, industries, and other domestic purposes. Not all types of water but the mineral added purified water is safe for the human being. Unfortunately, in this age of development, it's very difficult to get naturally purified water because of the application of chemical fertilizer to get more production from agriculture, extensive industrialization pollutes groundwater resources badly. So, it's high time to think about this most valuable resource. In this context, current research aims to identify the most polluted or vulnerable zones of groundwater in the Birbhum district. From several studies, it has been found that Birbhum district is one of the fluoride contaminated districts. Except, fluoride, another chemical component i.e. iron is also another harmful component in this district. Therefore, to assess the most vulnerable groundwater zones DRASTIC model has been applied here. DRASTIC is a widely used model for this purpose. This study deals with how the application of the DRASTIC model can help to extract the vulnerable zones of groundwater. To run the DRASTIC model various parameters viz. Depth to water level, Net recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and Hydraulic conductivity have been used here. The final vulnerable map shows that the western part is more vulnerable than the eastern part because the western part consists of the plateau fringe area with basalt and granite and more weathering prone that's why contamination of harmful minerals dissolve with groundwater most quickly. Moreover, the groundwater level is near to surface in the western part due to the presence of hard rocks near the surface than the eastern part. The applied DRASTIC model has been validated using the receiver operating characteristic curve (ROC) and this curve has been prepared based on some random points composed of various harmful chemical components. The result of the receiver operating characteristic curve depicts that this model is 73% valid in this concerned region.

Keywords DRASTIC model · ROC curve · Groundwater vulnerability · Net recharge

Introduction

About 34% of freshwater of the globe is contribution of groundwater, which is the most valuable natural resource of the world (Shekhar and Pandey 2015). It fulfills our miscellaneous requirements of various fields like the irrigation sector, industrial sector, and domestic use (Agarwal et al. 2013). In India, 50% population of the urban area and 90% population of the rural area depend on groundwater for their domestic use of water. Apart from this 70% of groundwater is used for agricultural activities in India (GEC 2015). But nowadays, high population growth induced massive groundwater pollution due to different harmful actions like unscientific agricultural, industrial activities, and urbanization (Foster 2002). Different anthropogenic activities like

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Evaluation of Cytotoxic Potential of Acetamiprid on *Allium cepa* L.

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A B S T R A C T

The present study was undertaken to evaluate the genotoxic potential of acetamiprid on *Allium cepa* L. root tip cells. *A. cepa* L. roots were treated with different concentrations of acetamiprid (0.25, 0.5, 0.75 and 1.0 gL^{-1}) for different time intervals. The results indicate that acetamiprid significantly decrease the mitotic index when compared with their controls (distilled water) at all concentrations and treatment periods. As well as it significantly increases chromosomal abnormality frequency and mitotic inhibition. Different types of physiological and clastogenic kinds of chromosomal aberration were also recorded. This study therefore confirms that acetamiprid acts as a mitotic depressor and mutagenic agent on plant cells when absorbed in a high dosage with prolonged time duration. Therefore, for every chemicals EC_{50} dose must be determined before field application.

Key words: Acetamiprid, *Allium cepa* L., Clastogenic aberration, Genotoxic, Mitotic depressor

Now-a-days the use of insecticides in agriculture is a common practice, which constitutes a wide group of chemicals. Though different kinds of insecticides enhance the yield of the crop production, but the residues are a common cause of water and soil pollution (Rasgele 2017). Despite the beneficial outcome associated with the use of insecticides, many of those chemicals may cause potential hazards to humans and the environment (Nag *et al*. 2013). Insecticides have a general property, which is lethal to some groups of targeted insects but not to the rest of other species including humans. But, due to lack of proper knowledge of farmers, unnecessary excessive uses of insecticides lead to harmful toxic effects on crops (Mishra *et al*. 2015). Though the phytotoxicity is not always correlated with genotoxicity (Kovalchuk *et al*. 1998, Fisun and Rasgele 2009, Paul *et al*. 2013). India is such a country that has an agriculture-based economy, so the application of various types of insecticide is a major concern. Thus, cytotoxic investigations of those crops are extremely significant (Rodriguez *et al*. 2015). Many investigations have been performed to understand how the genotoxic effect visualized in newly formed cells through mitotic cycle division following the treatment with various reagents (Umar 2004, Dinez *et al*. 2009, Fisun and Rasgele 2009, Nwangburuka and Oyelana 2011, Panneerselvam *et al*. 2012, Rasgele 2017).

Acetamiprid is a widely used popular insecticide. This is an organic compound of neonicotinoid insecticide products under the trade name "Pride" (Paul *et al*. 2013). This chemical has a translaminar activity and with contact and stomach action belonging to the group of neonicotinoids. It is used to protect plants against sucking insects such as aphids, Hemiptera, Lepidoptera, Thysanoptera etc. on crops, leafy vegetables, fruit plants, ornamental plants and flowers (Nag *et al*. 2013). The present study was aimed to investigate the cytotoxic potency of the root tip cells of *Allium cepa* L. through mitotic cell division on the effects of acetamiprid – a widely used insecticide. In this study *Allium cepa* L. is used as a test plant because of its relatively large chromosome size and relatively low chromosome number in their somatic cells; that is suitable for cytological manipulation (Mercykutty and Stephen 1980). Farmers of different locality applied this insecticide as a spray in the field on different crops to control sucking insects @ 0.2 to 0.6 gL^{-1} of water usually (Nag *et al*. 2013, Nemade *et al*. 2017). Thus, this study was very much effective for the agronomical research in respect of cytological aspects.

MATERIALS AND METHODS

The chemical formula, CAS (Chemical Abstracts Service) number and molecular mass of the insecticide

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Evaluation of Phylogenetic Relationships of Some Medicinally Important Species of *Solanum* Based on Seed Protein Profile of SDS-PAGE

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Abstract Total amount of soluble seed protein along with its protein profile of nine species of *Solanum* was investigated through SDS-PAGE. *S. nigrum* and *S. macranthum* contain maximum and minimum amount of total soluble seed protein per gm of tissue respectively. A dendrogram based on Jaccard's similarity index and also on the basis of presence and absence of peptide bands revealed two major clusters- upper cluster (UC) and lower cluster (LC). Both the clusters are again sub-divided in two sub-clusters like UC1, UC2 and LC1, LC2. *S. nigrum* being evolutionary more closely (91%) related to *S. villosum* than *S. americanum*, has been placed in UC1 while *S. americanum* along with *S. sisymbriifolium*, *S. macranthum* and *S. torvum* are placed within UC2. *S. indicum* and *S. erianthum* showed close resemblance and are placed in LC1 while LC2 contains only *S. xanthocarpum*, which shows least similarity with other studied species of *Solanum* and thus occupies a distinct place on the dendrogram. Based on these results, the genus *Solanum* can be divided into two sub genera and the distribution pattern of these species in the two sub genera does not corroborate with the conventional classification. The present study thus provides useful information for the identification of the taxa, their relationship and delimitation of their taxonomic status. So, this omega taxonomical approach may be very much beneficial for future proteomics study.

Keywords Dendrogram, SDS-PAGE, Seed Protein, *Solanum*, Sub Genera

1. Introduction

Solanum is one of the most economically valuable genera among the 98 genera of 'nightshade' family Solanaceae; which contains approximately 2700 species [1]. Members of this genus are distributed throughout the world, especially in tropical and worm temperate regions, among which largest sub-genus *Leptostemonum* or 'spinous *Solanum*' are predominant in India wildly [2]. The genus is not only important for its food value but also equally valuable for its pharmaceutical demands. Several major cultivated crops of *Solanum* such as *S. tuberosum* L. (potato), *S. melongena* L. (eggplant), *S. lycopersicum* (tomato), *S. muricatum* Aiton (pepino) etc. are cultivated throughout the world and they provide lots of food security in most of the countries of developing world [2].

More than hundreds of pharmaceutically important alkaloids are found in different wild and cultivated species of *Solanum* such as solasodine, solasonine, solamargine, solanidine etc. Beside alkaloids sterols, saponins, flavonoids, fatty acids, amino acids, glycosides etc. are also present among the members of *Solanum* [3]. That is why most of the species are used as analgesic, antinarcotics,

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Phytochemical Screening and *In-vitro* Evaluation of the Antibacterial Potential of Leaf Extract of *Eucalyptus globulus* against some Pathogenic Bacteria

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A B S T R A C T

Plants are healthy and natural resource of life. In particular, medicinal plants are of great importance with endless therapeutic properties useful for curing various diseases with an advantage of being natural. The present study is to evaluate the qualitative estimation of phytochemicals and antimicrobial activity of ethyl acetate, hexane, chloroform, methanol extracts of leaves of *Eucalyptus globulus* against the following microorganisms: *Bacillus subtilis*; *Enterococcus faecalis*; *Staphylococcus aureus*; *Proteus vulgaris*; *Escherichia coli* and *Klebsiella pneumoniae*. The process was carried out by agar well diffusion method. The extracts were poured into the wells at different concentrations like 25mg/ml, 75mg/ml, 150mg/ml and 300mg/ml. After incubation zones of inhibition were observed. As the concentrations of extract increased the activity also increased and thus the zone of inhibition too increased. Among four extracts, zone of inhibition was best in ethyl acetate extract. In case of *Staphylococcus aureus*, the ethyl acetate extract (300 mg/ml) showed maximum zone of inhibition 46.0 ± 2.0mm, while in case of *Klebsiella pneumoniae*the hexane extract (25 mg/ml) showed minimum zone of inhibition 15.0 ± 0.0 mm. Ethyl acetate extract is more effective than other three extract. Hence *Eucalyptus globulus* can be used in developing drugs and medicines against various activities of bacteria. Study has also been shown the presence of various phytochemical constituents such astannin, saponin, glycosides, alkaloids, phenolic content in the leaf of *Eucalyptus globulus*. The *Eucalyptus globulus* oil has antimicrobial activity against different microorganisms and appears to be a viable alternative as germicidal agent hence, further investigation is recommended. Its antimicrobial activity was evaluated against six bacterial species, including food poisoning and spoilage bacteria and human pathogens. The results of the antibacterial activity tests revealed that the leaf extract of *E. globulus* has rather a strong antibacterial activity, especially against *Staphylococcus aureus.*

Key words: Antibacterial, Eucalyptus *globulus, Bacillus subtilis, Enterococcus faecalis, Staphylococcus aureus, Proteus vulgaris, Escherichia coli, Klebsiella pneumoniae*

The spread of drug resistant pathogens is one of the most serious threats to successful treatment of microbial diseases and growing problem of antimicrobial resistance has become a important public health concern worldwide and especially in developing countries as a result of overuse and misuse of antibiotics (Ruifang *et al*. 2006). Many plants are used for different industrial purposes such as food, drugs, and perfumery manufacturing (Zarai *et al*. 2012). Their use has taken place since ancient times, and despite many of them were substituted by synthetic ones, the demand for natural products is increasing (Guillén *et al*. 1996). They have been shown to possess antibacterial, antifungal, antiviral, insecticidal and antioxidant properties (Burt 2004, Kordali *et al*. 2005). Aromatic and medicinal plants which push in the whole world have therapeutic virtues, because they produce certain bioactive molecules

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Electromagnetically induced transparency and electromagnetically induced absorption in Y-type system

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The propagation of a probe field through a four-level Y-type atomic system is described in the presence of two additional coherent radiation fields, namely, the control field and the coupling field. An expression for the probe response is derived analytically from the optical Bloch equations under steady state condition to study the absorptive properties of the system under probe field propagation through an ensemble of stationary atoms as well as in a Doppler broadened atomic vapor medium. The most striking result is the conversion of electromagnetically induced transparency (EIT) into electromagnetically induced absorption (EIA) as we start switching from weak probe regime to strong probe regime. The dependence of this conversion on residual Doppler averaging due to wavelength mismatch is also shown by choosing the coupling transition as a Rydberg transition.

Keywords: Y-type system, density matrix method, electromagnetically induced transparency (EIT), electromagnetically induced absorption (EIA)

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1. Introduction

Interaction of atom with coherent radiation fields can lead to many interesting physical phenomena like coherent population trapping (CPT),[1–4] electromagnetically induced transparency (EIT),[5–8] electromagnetically induced absorption (EIA),[9,10] lasing without inversion (LWI),[11,12] subluminal and superluminal propagation of light,[13–15] optical delay generation,[16,17] etc. All these phenomena are expected to have useful applications in future optical devices. Since its theoretical prediction[18] and experimental realization,[5] EIT has become one of the most widely studied topics in quantum optics. EIT makes an otherwise absorptive medium transparent to a resonant or near resonant coherent probe field propagating in the presence of a strong control field. Due to steep variation in the group index around an EIT window and subsequent reduction in the group velocity of the probe pulse,[19] EIT has found immense application in optical delay generation,[16,17] stopping and storage of light,[20] etc. All these are expected to form the backbone of future optoelectronic devices, optical communication, all optical logic gates, and quantum computation. Often a dark-state model is used to explain EIT.[6] In bionic systems also, highly efficient energy transfers between donors and acceptor can be modelled by using a dark-state channel.[21] This is useful to understand the phenomenon of photosynthesis. Similar theoretical study on artificial light harvesting by using dimerized Möbius ring has been reported by Xu *et al.*[22] All these point towards the diverse fields of application of quantum interference phenomena.

Phillips and his co-workers[23] first demonstrated storage of light in Rb vapor at ~ 70–90 °C by forming an effective three-level Λ type system. The three-level Λ type system has also been used to show sub-Doppler resolution in an inhomogeneously broadened medium under intense control field.[24] Using an indirectly coupled resonator, Wang and his co-workers studied transparency and absorption, theoretically as well as experimentally, modulated by chiral optical states at exceptional points.[25] They also discussed the possibility of using the findings of this study in optical quantum memory devices and optical computation. Agarwal and Harshwardhan[26] demonstrated the inhibition and enhancement of two-photon absorption in a four-level Y type system. They used two counter propagating weak fields in the Ξ formation and then applied a strong control field which is co-propagating with respect to the weak probe field. The control field acts from the intermediate level, which is common to all three fields, to another excited state. They have considered both Doppler free medium as well as Doppler broadened medium. Later, Gao *et al.*[27] showed electromagnetically induced inhibition of two-photon absorption in sodium vapor at 230 °C under two-photon resonance condition. Mirza *et al.*[28] demonstrated the effect of the wave vector mismatch on electromagnetically induced transparency in a four-level Y-type system under weak probe propagation in presence of two stronger fields. They compared the probe absorption and EIT line shape for the same propagation constants of the control

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Atom localization in cascade type system

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Abstract: A three-level cascade type system is subjected to a standing wave (SW) field acting between the ground energy level and the intermediate energy level of the system and the probe field scans the uppermost energy level from the intermediate energy level. Optical Bloch equations (OBE) for this three-level system are derived from the Liouville equation (Master equation) where the decay terms are added phenomenologically. These OBEs are solved analytically under steady state condition by using weak probe approximation. Under doppler free condition precession of localization was controlled by tuning the SW rabi frequency and relative orientation of the applied fields.

Introduction:

Atom localization [1] is a process in which atoms get confined within a very narrow spatial region. Precession measurement of a single atom has potential application in nanolithography [2], Bose Einstein Condensation [3] and laser cooling [4]. The strong localization of atoms in cold atomic system also modifies the optical properties of the medium and can be used in fabricating optical logic gates, storage of light etc. There are several reports on different techniques to localize atoms within a narrow spatial region. Thomas and his co-workers demonstrated that sub optical wavelength localization could be achieved via a light-shift gradient for atom imaging [5].Later atom localization was achieved by atoms interacting with a standing wave and this was confirmed by using the phase shift measurement of the optical field [6], homodyne detection [7] and quantum trajectories [8]. Later phase shift of atomic dipole-moment [9] and entanglement between the atomic position and its internal state were used to localize the atom without directly affecting the spatial wave function of the particle [10]. Detection of spontaneously emitted photon due to its interaction with a classical standing wave field and the reservoir modes [11] has also been suggested by several groups but it is not easy to control spontaneous emission experimentally. To overcome this difficulty measurement of upper level population [12], probe absorption [13] and coherent population trapping [14] were used for atom localization study. All these mentioned phenomena [12-14] have experimental realization in pump-probe experiment. B.K. Dutta et al discussed the electromagnetically induced grating [15] phenomenon by using a three level Ξ type system interacting with one dimensional (1D) standing wave field. Ivanov and Rozhdestvensky have proposed a two-dimensional (2D) atom localization scheme using a four-level tripod system via measurement of the population in the upper state or in any ground state [16]. Atom localization via spontaneous emission in a five-level M-type atomic system

Electromagnetically induced transparency in Y-type atomic system

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Abstract. Probe field propagation through a four-level Y-type system is studied analytically under steady state condition by using density matrix formulation. The probe field scans the intermediate state from the ground state whereas two other coherent radiation fields, namely the control field and the coupling field, are set to couple two different excited states from the intermediate energy level. Under Doppler free condition, simulated probe absorption shows single or twin EIT windows depending on whether the control and the coupling field are on-resonant or detuned. Under Doppler broadened condition, the residual Doppler averaging due to wavelength mismatch between the probe field and the control field as well as that between the probe field and the coupling field plays significant role in the formation of transparency window.

1. Introduction

Electromagnetically induced transparency (EIT) [1-5] arises due to destructive quantum interference between two absorption pathways and makes an otherwise absorbing medium transparent to a weak probe field in presence of a resonant or near resonant coherent control field. The two fields share a common energy level. Out of the three basic three-level systemsΛ, V and Ξ, theΛ type system is ideal for observing EIT [5]. Study of probe response using multi-level systems like 'M' type, 'N' type, Y-type, inverted-Y type etc. often shows additional features because in multi-level systems the presence of additional coherent radiation fields introduces additional coherence effects.The multi-level systems may be considered as a combination of more than one basic three-level; systems. As for example, the inverted-Y type system is conceived of as a superposition of Λ andΞ type systems [6-9]. Similarly the four-level Y-type system can be considered as a superposition of two Ξ type systems [10]. Agarwal and Harshawardhan discussed how transparency can be created in a two-photon absorption background. They also showed the possibility of enhanced two-photon absorption in presence of Doppler broadening [10]. Later, using a Y-type scheme Gao and co-workers demonstrated inhibition of absorption in Na vapor kept at 230°C [11]. B. K. Dutta*et al* discussed the effect of vacuum induced

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An experimental and theoretical understanding of a UV photodetector based on Ag nanoparticles decorated Er-doped TiO_2 thin film

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Abstract

Glancing angle deposition (GLAD) was employed to synthesise plasmonic Silver (Ag) nanoparticles (NPs) on the chemically prepared Erbium-doped Titanium dioxide (Er:TiO_2) thin films (TFs). The impact of using Ag NPs on the morphological, optical, and electrical aspects of Er:TiO_2 TFs were sequentially analysed. From the field emission scanning electron microscopy (FESEM) image, the Ag NPs appeared spherical and uniformly distributed on the Er:TiO_2 TFs. The size (diameter) of the maximum number of Ag NPs was ~15 nm (calculated from FESEM image). Energy dispersive X-ray (EDX) spectra assured the presence of Ag NPs on the TFs. X-ray diffraction (XRD) pattern for Ag NPs decorated Er:TiO_2 TFs closely resembled the face centred cubic crystal structure of Ag NPs and body centred tetragonal Ag–O compound. The optical spectroscopy (UV–visible diffuse reflectance and photoluminescence) elucidated that the absorption of light was significantly enhanced in the UV–visible spectral range for the TFs in which Ag NPs were sandwiched between Er:TiO_2 TF layers (Er:TiO_2/Ag NPs/Er:TiO_2). The Schottky contact-based Au/Er:TiO_2/Si photodetector (PD) and Au/Er:TiO_2/Ag NPs/Er:TiO_2/Si (plasmonic) PD were constructed. The plasmonic PD offered a better photo-responsivity of ~4.5 fold higher as compared to Er:TiO_2 TF-based PD upon 380 nm illumination under −6 V bias. An increase in detectivity and a decrease in noise equivalent power was observed for the plasmonic device compared to Er:TiO_2 device in the UV region. A theoretical approach had been adopted to calculate the wavelength-dependent responsivity for both devices. Further, the important parameters like photoconductive gain, electron transit time and electron mobility were calculated by simulating the experimental responsivity curves of the devices. These parameters exhibited improvement in the UV regime for the plasmonic PD. The fast temporal response with short rise and decay time proves the excellent efficiency of the plasmonic UV PD.

Detection technique for vitamin D_3 using Er-doped TiO_2 nanowire-based UV photodetector

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Abstract. Vitamin D_3 acts as a crucial biomarker for various diseases. Current methods for vitamin D_3 detection are time-consuming, expensive, and require trained personnel. We report a simple and cheap photodetector (PD)-based vitamin D_3 detection technique for the first time using Ag nanoparticles-covered Er-doped TiO_2 nanowires. The operational stability of the device was tested under the dark as well as the UV light illumination. Vitamin D_3 solution produced absorption bands at 222 and 280 nm, respectively. The PD current density varied from 1.29×10^{-4} A/cm^2 to 1.74×10^{-4} at -4 V for pure ethanol solution and 20 pg/ml D_3 solution, respectively (under 220 nm illumination). The average absolute current values were reduced from 3.25 nA (220 nm) and 2.9 nA (340 nm) for 5 pg/ml to 2.95 nA (220 nm) and 2.54 nA (340 nm) for 30 pg/ml D_3 solution, respectively. The current gradually increased up to 3.34 nA (220 nm) and 2.7 nA (340 nm) as the concentration was increased up to 80 pg/ml. The PD current/vitamin D_3 concentration decreases exponentially from 0.58 to 0.03 nA/g/ml) for 5 and 80 pg/ml, respectively, under 220 nm excitation, from which an unknown concentration of vitamin D_3 can be obtained. © *2020 Society of Photo-Optical Instrumentation Engineers (SPIE)* [DOI: 10.1117/1.JNP.14.046001]

Keywords: Er-doped TiO_2; glancing angle deposition; nanowires; optoelectronic properties; photodetector; vitamin D_3 detection.

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1 Introduction

Lab-on-a-chip devices have been developed for the detection of bio-species[1] via electrochemical,[2] microelectronics-mechanical system (MEMS),[3] and photon detection[4,5] methods. The electrochemical and MEMS technology preferred direct contact of the biomolecules with the active medium of the sensors.[3] In case of biosensors, the sensing of biospecies can be done by changing the dielectric constant of the material medium under physical contact with the biospecimen. So it can be manifested that the change of dielectric constant, as well as the resistance of the detection layer (material media) on interaction with the specimen, is the main principle for the analysis of biomolecules. Extraction of biospecimen from a human cell for the *in vitro* testing is painful and the reuse of the sensors are questionable.[6,7] The field-effect transistor-based biosensors are mostly studied for biospecimen sensing due to the changes in the capacitance,[8] or in the resistance (or current)[9,10] of the devices. In the above viewpoint, optical detection and imaging technology would be far more attractive to clinical researchers and biotechnology

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UNIQUENESS OF L-FUNCTION AND ITS CERTAIN DIFFERENTIAL MONOMIAL CONCERNING SMALL FUNCTIONS

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Abstract. Concerning Small functions and weighted sharing we study the uniqueness of L-function and its certain differential monomial. Our results in this paper improve and extend some earlier results.

Keywords: L-function; uniqueness; small function; weighted sharing; differential monomial.

2010 AMS Subject Classification: 11M36, 30D35.

1. INTRODUCTION

For a long time a lot of attention have been given by many scholars on the Riemann hypothesis. The Riemann zeta function is defined by the following infinite series $\zeta(s) = \sum_{m=1}^{\infty} 1/m^s = \prod_p (1-1/p^s)^{-1}$ where $s = \sigma + it$, $\sigma > 1$ and p denotes prime number and the product is taken over all prime numbers. Throughout the paper an L-function L means an L-function L in the Selberg class. Such an L-function is defined by $L(s) = \sum_{m=1}^{\infty} a(m)/m^s$ satisfying the following hypothesis

(i) Ramanujan hypothesis: For every $\varepsilon > 0$, $a(m) \ll m^{\varepsilon}$.

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ON THE UNIQUENESS THEOREMS OF L-FUNCTIONS CONCERNING WEIGHTED SHARING

NIRMAL KUMAR DATTA AND NINTU MANDAL[1]

ABSTRACT. We mainly study the properties of L-functions using Nevanlinna value distribution theory in the extended selberg class. In this paper, we investigate the relationship between meromorphic functions and L-functions concerning weighted sharing with the help of Nevanlinna value distribution theory. We prove a uniqueness theorem of a meromorphic function and an L-function when they share $(0,0)$ and $(1,1)$. We also get valuable information about the counting of the zeros of L-functions. The results of this paper improve some recent results of W. J. Hao and J. F. Chen [1].

1. INTRODUCTION

L-functions play very important role in the modern number theory. One common thing is that all the L-functions can be described by an Euler product. So all the L-functions can be described as a product taken over prime numbers. Considering unique prime factorization of integers we can represent L-functions as Dirichlet series. We may regard the famous Riemann zeta-function, $\zeta(z) = \sum_{n=1}^{\infty} 1/n^z = \prod_p (1 - 1/p^z)^{-1}$ where $z = \sigma + it$, $\sigma > 1$ and p denotes prime number and the product is taken over all prime numbers, as the prototype. We can get valuable information on the algebraic structure from the value distributions of the L-functions which is not obtainable by the elementary algebraic method. In particular, the distribution of zeros of L-functions is of special

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Key words and phrases. Meromorphic functions, L-functions, Weighted sharing, Uniqueness.

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Small Functions and Uniqueness of Difference Differential Polynomials of L-functions

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Abstract

In this paper, we study the value distributions of L-functions in the extended Selberg class. We prove two theorems which shows how difference differential polynomials of L-functions and difference differential polynomials of meromorphic functions uniquely determined concerning weighted sharing of small or rational functions. Our results improve and generalize some recent results due to W. J. Hao, J. F. Chen [3], W. Q. Zhu, J. F. Chen [16] and N. Mandal, N. K. Datta [10].

2010 Mathematics Subject Classification: 11M36, 30D35

Keywords: Meromorphic functions, L-functions, Weighted sharing, Uniqueness.

1. INTRODUCTION

L-functions are the most important objects in the modern number theory. The Riemann hypothesis and its extension to the general classes of L-functions is the most important unsolved problem in pure mathematics.

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Polynomial Sharing and Uniqueness of Differential-Difference Polynomials of L-functions

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Abstract

In this paper, we study value distributions and uniqueness problems of differential-difference polynomials of L-functions. Considering polynomial sharing of certain differential-difference polynomials of an L-function with that of a meromorphic function we prove a uniqueness theorem which improve and generalize some earlier results due to Hao, Chen [4], Zhu, Chen [16], Mandal, Datta [10] and Datta, Mandal [2].

Keywords and phrases: Meromorphic functions, L-functions, Weighted sharing, Polynomial sharing, Uniqueness.

2010 Mathematics Subject Classification: 11M36, 30D35

1. INTRODUCTION

For the last 150 years the most important open problem in pure mathematics is considered to be the Riemann hypothesis and its extension to the general classes of L-functions. L-functions are most important objects in the modern number theory. Let a function L be defined by the Dirichlet series $L(z) = \sum_{n=1}^{\infty} a(n)/n^z$ with $a_1 = 1$ satisfying the axioms (i) $a(n) \ll n^{\epsilon}$, for every $\epsilon > 0$, (ii) there exists an integer $k \geq 0$

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Optical, structural, and antibacterial properties of biosynthesized Ag nanoparticles at room temperature using *Azadirachta indica* leaf extract

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ABSTRACT

We report an enhancement of antibacterial properties of Ag nanoparticles (NPs) synthesized at room temperature using leaf extract of *Azadirachta indica* (Neem) following green synthesis route. To study such antibacterial properties Ag NPs of sizes within 9 nm to 17 nm were synthesized by varying the concentration of Neam leaf extract (NLE). The NP size and size distribution were seen to increase and decrease, respectively, with increase in NLE concentration. Also Ag NPs having a fixed size (~26 nm) was also synthesized by varying the precursor ($AgNO_3$) concentration. It is noticed that concentration of NLE has significant effects on the control of NP size as well as size distribution whereas there is almost no role of precursor concentration of the NP size. All the Ag NPs are found to have face-centred-cubic crystal structure with preferential growth along (111) plane which is stable one. The peak of X-ray diffraction at ~32.4° (2θ value), which is prominent for low concentrations of NLE and precursor, is identified as (101) plane of Ag crystal. The generation and growth of Ag NPs had also been confirmed using electron microscopic studies. These Ag NPs show prominent surface plasmon resonance (SPR) absorption at ~ 420 nm confirming again the genesis of Ag NPs. The SPR peak shifts towards longer wavelength (redshift) with a corresponding reduction in full width at half maximum with increase in NP size. All of the samples containing Ag NPs show a broad blue photoluminescence (PL) emission at ~ 471 nm. Emission peak is seen to redshift with increase in NP size and is consistent with the optical absorption data. Such PL emission is argued as due to interband transition or plasmon luminescence. Being biocompatible of the green synthesis process, antibacterial properties of these Ag NPs were studies in details considering all the samples (with varied NP size for one set and with fixed NP size for other set of samples). As per our knowledge this is the first report of size related total study of Ag NPs, showing increased antibacterial effect as size decreased and equal antibacterial effect as size equals. It is found that smaller Ag NPs has enhanced antibacterial effects due to large surface area to volume ratio in comparison with bigger sized Ag NPs.

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مكانة الحديث والسنة عند الإمام الفراهي

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ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

إن الحديث والسنة أهم مصادر الشريعة الإسلامية بعد كتاب الله، ولقد اهتم المحدثون بالحفاظ على أقوال وأفعال وموافقات الرسول ﷺ، وليست هذه خدمة جليلة للمسلمين فحسب، بل هي مساهمة انفردوا بها ولا تستطيع البشرية أن تقدّم نظيرها في تاريخها الطويل، ولكن على الرغم من ذلك هذا واقع أن مستوى بحث جميع كتب الأحاديث ليس متساويًا، وبما أن الحديث والسنة يتعلقان بأصول الإسلام فعزو قول أو عمل أو موافقة إلى الرسول ﷺ أمر خطير، وإذ جُعلت أصول الرواية هي المستوى الوحيد لقبول الحديث غفلوا عن أصول الدراية عامة، وقد قُرِّرَتْ الرواية أيضًا معيارًا لقبول النص والاستدلال منه حتى بعد جمع الحديث، ولم توجه عناية خاصة إلى الدراية. حتى اهتمّوا بالشروح والتعليقات حال اختلافها. وهذا أسفر عن أهمية المصطلحات وعمّ الاتجاه بين عامة المسلمين بأن تقبل الأخبار كلها التي جاءت بكلمة "حدثنا" و"أخبرنا" ولا يُسمح لأحد بالتفحيص في هذا الصدد مما أدّى إلى نشر سوء فهم الدين بين الأمة، وهكذا وقع الجمود في نقد الأحاديث، فقد بذل العلامة الفراهي أكبر جهد في كتابه "إحكام الأصول بأحكام الرسول" للقضاء على الاتجاه التقليدي القديم في الأصول، ولتقديمه

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دور علماء مدرسة الإصلاح
في تطوير الصحافة العربية في الهند

- د. محمد معتصم الأعظمي[1]

تاريخ الصحافة العربية في الهند غير المنقسمة تبتدئ من المجلة الأسبوعية "النفع العظيم لأهل هذا الإقليم" التي صدرت في السابع عشر من شهر أكتوبر 1871م تحت رئاسة الشيخ مقرب علي.[2] وإدارة تحريرها الفخري. جي. دبليو. ليتنر .G.W) (Leitner. ومنذ تلك الفترة صدرت مجلات عديدة من الهند وباكستان بعض منها توقفت بينما البعض يستمر صدورها.[3]

مدرسة الإصلاح مدرسة إسلامية تأسّست لنيل الاختصاص في القرآن الكريم وعلومه. وكان من مؤسسيها ومنشئيها العلامة شبلي النعماني والإمام عبد الحميد الفراهي، وكل منهما كان عالمًا كبيرًا للغة العربية وشاعرًا لها. ولقد تطوّرت المدرسة تطورًا كبيرًا تحت إدارة الإمام عبد الحميد الفراهي رحمه الله تعالى.

درّبت هذه المدرسة وخرّجت علماء كبارًا وأدباء بارزين وشعراء مفلقين لمختلف اللغات قاموا بتقديم خدمات جليلة في مختلف المجالات العلمية والأدبية والفنية مما يطول بذكرها المقال. ففي هذه العجالة نركّز حديثنا على خدماتهم في مجال الصحافة العربية.

---

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[2] سليم الرحمن الندوي: الصحافة الإسلامية في الهند تاريخها و تطورها، ص 81 وأيوب تاج الدين الندوي: الصحافة العربية في الهند نشئتها وتطورها، ص 83

[3] المصدر نفسه، ص 3 وسليم الرحمن خان الندوي: الصحافة الإسلامية في الهند تاريخها وتطورها، ص 81

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PARAMETERS OF CHILD MORTALITY IN FOUR EASTERN STATES OF INDIA

Ramananda Roy*

ABSTRACT

Objectives: *To focus on the association between the mothers autonomy within the household and the use of maternal, newborn and child health care, and the impact of mother's autonomy, the use of maternal, newborn and child health care on the child mortality across different social settings of Some Eastern States of India.*

Methods: *The Probit regression analysis and Joint estimation technique are used to carry out the research work. The joint estimation is done by applying Conditional Mixed Process (Stata-12) technique (David Roodman 2009, 2013) to estimate the Endogeneous model of estimation because of binary and categorical characteristics of variable. NFHS-4 dataset of India is hereby used.*

Result: *Woman's education and autonomy along with the standard of livings, pregnancy complications and age of mothers are found to be more effective determinants of maternal health care usage in the eastern part of India. The increase in the usage of maternal health care helped to curtail the hazard of child mortality.*

Conclusions: *Women autonomy is influenced greatly by the higher level of women education and thereby influenced very much the utilization of various maternal healthcares. The better utilization of maternal and newborn health care helped to improve the child mortality hazards. Hence proper strategies and interventions are needed to be furnished to curb the ensuing health challenges of this area as well* as the nation.

Keywords: *Women Autonomy; child mortality; maternal health care; institutional delivery; prenatal care.*

Introduction

Good health is now regarded as an important parameter for human capital formation and thereby improving the growth of a country. The health of a child plays an important role in human capital formation. Poor health of children has long-term influence in the form of the poor health of adults and hence leads to low levels of human capital formation. It is an important indicator of child health and overall economic development. The child mortality is considered hereby the specific health outcomes. We can see huge improvements in the availability and access to reproductive and maternal health care in India over the years. Child mortality {e.g. infant (0–1) and young children (0–4)} rates have also declined from 58 to 34 over the years 2006-2016 in India (table-1). The child mortality rate per 1000 live births is recorded in the states of Bihar, Jharkhand, Orissa, and West Bengal is 38, 29, 44, and 25 respectively in 2016.

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A PRELIMINARY STUDY OF TANCHANGYA CONSONANT SYSTEM

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ABSTRACT

Tanchangya, a Tibeto-Burman sub-tribe from the physiological perspective (as also claimed by the educated natives) but Indo-Aryan from the linguistic perspective, dominates the Chittagong Hill Tracts (CHT) of Bangladesh, South Mizoram, South Tripura, and East Myanmar and co-exist with Chakma. The present preliminary study, as the title indicates, aims at looking at the consonant system of the Tanchangya language.

Keywords: phonology, syllable, consonant, allophone

1. Introduction

Tanchangya is claimed to be a Tibeto-Burman sub-tribe from the physiological perspective (as also claimed by the educated natives) but Indo-Aryan from the linguistic perspective. The Tanchangya people dominate the Chittagong Hill Tracts (CHT) of Bangladesh, South Mizoram, South Tripura, and East Myanmar and co-exist with Chakma tribe. Moreover, in terms of food habit, religion, customs and political consciousness Tanchangya and Chakma tribes share immensely. It is also assumed that Tanchangya is a dialect of Chakma (an Indo-Aryan tribal language), the dominating language of the region. However, the native speakers of Tanchangya claim it as a separate language, not a dialect of Chakma.

We find that Tanchangya, an Indo-Aryan tribal language, has a well-defined linguistic system which has its distinct features and in several aspects, it maintains its status as a language different from and distinct from Chakma. Moreover, we will not at present enter into that controversy. The present study aims at looking at the consonant system of the Tanchangya language focussing on the phonemic status, distribution and allophonic aspects, if any, of the consonants. It is a preliminary study based on the data gathered from the natives living within the jurisdiction of Chakma Autonomous District Council (CADC) of south Mizoram.

2. Consonants of Tanchangya

Before we enter into the main focus of our study, we state that from the preliminary observation made during the present study, seven pure vowels system is found in the present language. These are /i/, /e/, /æ/, /a/, /ɔ/, /o/ and /u/. These are mentioned here for the convenience of our analysis of the consonant system of Tanchangya.

It is found that Tanchangya has twenty (20) consonant phonemes. These include nine (9) Plosives, two (2) Affricates, two (2) Fricatives, one (1) Lateral, one (1) Tap, three (3) Nasals and two (2) Semi-vowels. These are shown in Table 1. Each of the consonant phonemes contrasts with one or the other consonants. Following the principles of phonemic analysis as developed by Hockett (1963), this fact of distinctiveness has been made the foundation of determining the phonemic status of each of these within the Tanchangya phonological system as shown in the examples (1), (2) and (3).

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ORIGINAL ARTICLE

The response of groundwater to multiple concerning drivers and its future: a study on Birbhum District, West Bengal, India

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Abstract
Groundwater and its upcoming crisis are the present-day concern of the scientist. This research mainly focuses on responses of groundwater dynamicity to some important drivers, viz. agricultural yield, groundwater irrigated area, groundwater draft, landuse/landcover, and stage of development. The result of this study has been done under three sections. In the first section, the spatiality of groundwater has been discussed where it has been noticed that the western side of the district groundwater level is near the surface due to low drafting and low agricultural yield. Moreover, hard rock geology in the western part disappoints the drilling process. On the eastern part, rich alluvial soil influences high agricultural yield hence groundwater level lowering down rapidly. In the second section, the nature of groundwater levels has been analyzed through the boxplot, and cluster diagram, where boxplots have been drawn over different geological facies, which depicts groundwater is highly fluctuating in hard clay geology. For example, high agricultural intensity and high groundwater draft is the characteristic feature of hard clay geology. The dendrogram in cluster analysis represents a homogeneous groundwater level fluctuating station in three different time series. Last section deals with the future of groundwater level where an artificial neural network (ANN) model has been applied to extract the predicted groundwater level for 2030. This type of environmental analysis, such as groundwater fluctuations in relation to different sensitive parameters and the use of a machine learning model, would aid potential researchers and communities in making wise groundwater use decisions.

Keywords Multiple drivers · ANN model · Cluster analysis · Sustainability · Multilinear regression model

Introduction

Groundwater is one of the earth's precious natural sub-surface assets, and is used in various economic sectors such as irrigation, manufacturing and households. Groundwater is the only source of drinking water and represents 50 per cent of the population of the planet (Tharme 2003; Kløve et al. 2011; Razandi et al. 2015; Das and Mukhopadhyay 2020). Several experiments explain that the freshness of soil water is contaminated by climate change and increased human demand (Wada et al. 2016; Boretti and Rosa 2019; van Rooyen et al. 2020). The overflow of groundwater through irrigation for cultivation often simulates a daily increase in its depth (Tizro et al. 2018). However, groundwater is expected to be refilled by runoff and water supply (Adhikari et al. 2020). Not only irrigation, but also land use/land cover (LULC), agricultural yield, and soil drainage for different uses spatially and temporarily impact the amount of soil water. Differences in groundwater level impact its consistency directly (Das et al. 2019). LULC variation determines groundwater fluctuations, e.g. land use as well as urban and urbanization processes, affects the drafting and consistency of groundwater, on the one side, and, on the other, forest surface storage and supports groundwater for a long period of time (Wakode et al. 2018). The massive population increase, agricultural growth, urban expansion and changes in the structure of the LULC pattern directly lead to the use of groundwater resources and the degradation of their levels ((Lu et al. 2014; Ahirwar et al. 2020; Ansari et al.

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Asymmetric nexus between air quality index and nationwide lockdown for COVID-19 pandemic in a part of Kolkata metropolitan, India

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ARTICLE INFO

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COVID-19 pandemic
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ABSTRACT

The diffusion of COVID-19 or Coronavirus since last few months is the prime matter of concern for the entire world. The government of India had declared the complete lockdown from 24th March. After the second step lockdown, now third step lockdown was declared. So, India in Lockdown 3.0 situation. Although the economy of our country has severely been affected by the impact of lockdown, this situation is good for natural healing. Major metropolitan cities of India are trying to recover from various pollution. This study, therefore, attempts to analyze the trend of air pollution before and during a lockdown situation in Kolkata metropolitan and surrounding areas. To identify air pollution trends before and during the lockdown, the non-parametric Maan-Kendall test and Sen's slope estimator have been applied in this study. This research has been done based on air quality index data of the Kolkata metropolitan region's observatory stations. The time range of the data set is from mid of February to 2nd May. The study results show that air pollution has been reduced up to 80% in almost all the stations due to strict lockdown.

1. Introduction

Air is an utmost important element for the survival of all animals. So, there is a profound influence of air quality deterioration on all biotic elements. With rapid urbanization and industrialization level of pollution is increasing at a high rate. To meet the basic needs of the second-largest populous country of the world, the emission of harmful gases is contaminating the quality of the air drastically. Urban centres occupy nearly 5% of the earth's land surface. The air quality of these urban centres is very vulnerable due to excessive traffic contamination and industrial smog (Haque and Singh, 2017). About 1.1 billion people in the world are breathing unhealthy air (UNEP et al., 2003). The World Health Organization (WHO) estimated that urban air pollution is liable for 5% of the trachea, lung cancer, bronchus and, 1% of respiratory infections mortality and about 2% of cardiorespiratory mortality globally (WHO, 2002). Significant contributors to urban air pollution in India are vehicular emission and emission from red and orange industries (CPCB, 1998; Mukherjee et al., 2012). West Bengal Department of Environment, Chittaranjan National Cancer Institute, and the Central Pollution Control Board observed in a study that approximately 70% of the patients of the Kolkata who experience respiratory infections are caused by air pollution (Haque and Singh, 2017). Chicago University made an observation that air pollution in Kolkata is reducing the life expectancy of its residents by 3.5 years on average (Bandyopadhyay, 2020). Particulate Matters like $PM_{2.5}$ and PM_{10},

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Analysis of unsteady magnetohydrodynamic radiative thin liquid film flow, heat and mass transfer over a stretching sheet with variable viscosity and thermal conductivity

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ABSTRACT

The present article is related to the study of magnetohydrodynamic (MHD) heat and mass transfer in a thin liquid film over a permeable unsteady stretching surface in the presence of chemical reaction, applied magnetic field, viscous dissipation, and thermal radiation with variable viscosity and thermal conductivity. Computed results for unsteadiness parameter, temperature ratio parameter, radiation parameter in the presence/absence of the viscous dissipation and Ohmic heating are analyzed and discussed. The computed results reveal that the viscous and Ohmic dissipations reduce the temperature gradient profiles in the thin liquid film. Further, the thermal radiation decreases the cooling rate of the thin liquid film but the reverse effect is seen by increasing the Prandtl number.

KEYWORDS

Magnetohydrodynamics; stretching sheet; thin liquid film; thermal radiation; viscous and Ohmic dissipations; thermal conductivity

1. Introduction

The studies on thin film flows of Newtonian fluids over a permeable unsteady stretching sheet are important from engineering point of view such as in extrusion process of metal and polymer, glass fiber and paper production, wire drawing, hot rolling and in application of paints. Wang [1] first investigated on the motion of an unsteady thin finite Newtonian liquid film over an stretching sheet. Pantokratoras [2] investigated theoretically the effect of variable viscosity on heat transfer over a moving plate. Liu and Andersson [3] examined heat transfer in thin liquid film over an unsteady stretching surface by using multiple shooting method. Dandapat et al. [4] analyzed variable thermal properties on flow and heat transfer on a thin liquid film over an unsteady stretching sheet. Rashad [5] analyzed the effect of thermal radiation and variable viscosity on an unsteady rotating fluid over a stretching surface embedded in a porous medium with magnetic field. Liu and Megahed [6] observed effect of thermal radiation with variable heat flux on heat transfer aspect of a thin liquid film. Pal and Mondal [7] investigated thermal radiation effect of on MHD non-Darcy flow and heat transfer over a stretching sheet in presence of Ohmic dissipation. Reza-E-Rabbi et al. [8] developed a numerical model to examine a multiphase radiative Casson and Maxwell fluids flow behavior over a stretching sheet in the presence of nano sized particles. They also provided an impression of the activity of a nonlinear chemical reaction and the convergence and stabilization criterion of the numerical method. Hsiao [9–10] discussed about composed of activation energy taking electrical MHD Ohmic dissipation and mixed convection and also studied in heat and mass transfer energy conversion using Maxwell fluid. Manivannan et al. [11] studied the effect of thermal radiation and chemical reaction on an isothermal vertical oscillating plate with variable mass diffusion. Pal [12] analyzed the combined effects of thermal radiation and non-uniform heat source/sink on heat transfer over a permeable unsteady stretching surface.

Mahapatra et al. [13] studied effect of chemical reaction on free convection flow through a porous medium. Sharma et al. [14] examined the influence of chemical reaction on unsteady free convection flow and mass transfer. The effect of viscous dissipation on heat transfer in a non Newtonian liquid film over an unsteady stretching sheet was considered by Chen [15]. Hsiao [16] investigate viscous dissipation effects with MHD toward stretching sheet. Soundalgekar [17]

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Original research article

Microwave assisted gain in inverted-Y type atomic system

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ABSTRACT

The probe response in four-level inverted-Y configuration showsgainwithout population inversionin presence of microwave field.At on-resonant probe field, switching between superluminal and subluminal probe propagation under the influence of microwave field is discussed in details. Both the bandwidth and sharpness of optical switching can easilybe controlled by varying the microwave power. The switching action improves immensely if the control transition is chosen to be a Rydberg transition. The transient behavior of the atomic system ultimately settles into probe gain under the influence of the microwave field.A way of transferring population to the highest excited state through the application of microwave field is also discussed.

1. Introduction

Interaction between coherent electromagnetic fields and multi-level atomic systems leads to modification in the absorptive and dispersive properties of multi-level systems. Propagation of resonant or near resonant probe field through an atomic system is largely affected by the presence of a coherent control fieldwhich shares a common energy level with the probe field but excites a different transition path. Electromagnetically induced transparency (EIT) [1] is the result of destructive quantum interference between two transition pathways sharing a common energy level and is easiest to demonstrate in a three-level Λ type system [2] although one can found many reports on EIT in 'V' [3–4] and Ξ type systems [2,5,6] too. In multi-level atomic systems like Y type [7,8], inverted-Y type [9,10], N-type [11,12], M-type [13,14] etc. EIT has been achieved. Storage of light in Rb vapour under Λ type configuration was demonstrated experimentally by Phillips et al. [15].Agarwal and co-workersdiscussed how lasing without population inversion occursin a basic three-level Ξ type system in presence of a phase diffusing field as well as a chaotic field as the coupling field instead of a coherent control field [16]. They used this coupling field between the ground energy level and the intermediate energy level while the probe field is applied between the intermediate energy level and the uppermost energy level. In a later work Agarwal et al. demonstrated a way of controlling the light propagation from subluminal to superluminal through a three-level Λ type system by using a microwave field between the two closely spaced ground levels [17]. They also compared the group index variation in a Doppler free medium as a function of the Rabi frequency of the microwave field with that in a Doppler broadened medium.Li et al. demonstrated the dependence of probe transmission through Rb vapor on relative phases of optical and microwave fields [18]. The vapor cell contained Ne as buffer gas at 5 Torr pressure and the cell was kept within microwave cavity for efficient coupling of microwave field with Rb

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Detailed experimental and theoretical analysis of the high-temperature current conduction properties of Er-doped TiO_2 thin film based diodes

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Highlights

- High temperature current conduction mechanism of the diodes is theoretically analyzed.
- $Au/TiO_2/p\text{-}Si$ and $Au/Er{:}TiO_2/p\text{-}Si$ Schottky diodes are synthesized by spin-on method.
- Ideality factor, series resistance, etc. Are calculated using different approaches.
- Richardson plots are modified considering Gaussian distribution of barrier height.
- Proposed theoretical studies are useful for detailed analysis of these diodes.

Abstract

The high-temperature (303K to 413K) current conduction properties of $Au/TiO_2/p\text{-}Si$ (undoped) and $Au/Er{:}TiO_2/p\text{-}Si$ (doped) Schottky barrier diodes (SBDs) were analyzed. The barrier height (Φ_{b0}) increased, whereas the ideality factor (n) and series resistance (R_S) decreased for these devices with increasing temperature. The activation energy as well as Richardson constant (A^*) were determined from the temperature-dependent Richardson plot (R-plot). The calculated value [illegible] and considering a Gaussian

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Uniqueness Theorems Concerning Homogeneous Differential Polynomials of L-functions and Weakly Weighted Sharing

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Abstract

In this paper, we prove some uniqueness results when a polynomial and a homogeneous differential polynomial of an L-function weakly share a rational function. Our results improve and generalize some earlier results due to Mandal, Datta [10].

Key words and phrases: L-function, meromorphic function, uniqueness, weakly weighted sharing, homogeneous differential polynomial.

2010 Mathematics Subject Classification: 11M36, 30D35

1. INTRODUCTION

In 1992 a model for L-functions is introduced by Selberg. The study of value distributions of L-functions is mainly concerned with the set $\{z \in \mathbb{C} : L(z) = a\}$ where $a \in \mathbb{C}$.

A meromorphic function L is said to be an L-function in the Selberg class if it satisfy the following properties.

(i) $L(z)$ can be expressed as a Dirchlet series $L(z) = \sum_{m=1}^{\infty} a(m)/m^z$.

(ii) $\mid a(m) \mid = O(m^{\epsilon})$, for any $\epsilon > 0$.

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UNIQUENESS THEOREMS CONCERNING L-FUNCTIONS AND WEAKLY WEIGHTED SHARING

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Abstract. In this paper, we establish some uniqueness theorems when $p(L)$ and $P(L)$ share "$(R(z),l)$" where p, P and R denote polynomial function, homogeneous differential polynomial function and rational function respectively and L denotes an L-function in the extended Selberg class. Our results improve and generalize some recent results due to Mandal, Datta [11].

Keywords: L-function; meromorphic function; uniqueness; weakly weighted sharing; homogeneous differential polynomial.

2010 AMS Subject Classification: 11M36, 30D35.

1. INTRODUCTION

A model for L-functions is formulated by Selberg in 1992. The study of value distributions of L-functions is mainly concerned with the set $\{z \in \mathbb{C} : L(z) = a\}$ where $a \in \mathbb{C}$.

An L-function L in the Selberg class is a meromorphic function satisfying the following properties.

(i) $L(z)$ can be expressed as a Dirchlet series $L(z) = \sum_{n=1}^{\infty} a(n)/n^z$.

(ii) $\mid a(n) \mid = O(n^{\varepsilon})$, for any $\varepsilon > 0$.

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المعاهد التعليمية التي تعلّم فيها البروفيسور فيضان الله الفاروقي رَحِمَهُ اللَّهُ

- د. محمد معتصم الأعظمي[1]

إن الأستاذ فيضان الله الفاروقي بن السيد سبحان الله كان ينتمي إلى مديرية أعظم كره من ولاية أوترابراديش (الهند)، ولد في الـ5 من يوليو 1952م[2] في قرية كوئريابار (Koeriyāpār)،[3] وبدأ دراسته من قريته حيث شدّ من العلم وتعلّم اللغة العربية ثم التحق بـ"دار العلوم" مئوناث بهنجن 3 ذي الحجة 1376هـ في الصف الثالث من الأردوية ولم يبلغ السادسة من عمره ودخل في الصف السادس من الفارسية في 12 شوال عام 1379م ثم تم قبوله في الصف الأول من العربي عام 1387هـ فدرس كتب الأدب العربي وعلوم القرآن والأحاديث والفقه وما إلى ذلك من 1962م إلى 1965 ثم التحق بـ"إحياء العلوم"، مباركفور، ودرس الكتب العربية للصفوف المتوسطة ومكث بها من 1965م إلى 1967م ثم التحق بـ"دار العلوم"، ديوبند في عام 1967م وشفى غليله العلمي فيها متخرجًا منها عام 1968م ثم التحق بـ"كلية شبلي"، أعظم كره بالبكالوريوس وحصل على الشهادة عام 1974م. ثم ذهب إلى مدينة إله آباد والتحق بـ"جامعة إله آباد" وحصل على شهادة الماجستير في اللغة العربية عام 1976م وكذلك حصل منها أيضًا على شهادة الدكتواره عام 1984م.

وانتهى هنا زمن تعليمه، وبدأ يعلّم ويفيد الطلّاب والباحثين. وفيما يلي تعريف وجيز بالمدارس والمعاهد التي درس فيها الأستاذ الفاروقي:

أولًا: المدرسة الإسلامية العربية دار العلوم بمدينة مئوناث بنجن: تعتبر "المدرسة

[1] نائب مدير تحرير المجلة ومدرس، قسم اللغة العربية وآدابها، سيوري فيديا ساغر، بنغال الغربية، الهند

[2] بينما ذكر تاريخ ميلاده في سجل موجود في دار العلوم بمدينة مئوناث بنجن 4 يونيو 1950م

[3] الواقعة الآن في مديرية مئو بولاية أوترابراديش، الهند

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العروض والقوافي وشعر الإمام الفراهي العربي نموذجًا

- د. محمد معتصم الأعظمي[1]

لا يخفى على من له إلمام بالشعر أنّ العروض علم يدرس أوزان الشعر فيعرف الوحدات المكونة للوزن ويحدد قوانين تركيبها ويضع القواعد التي تخضع لها القصيدة العربية. وفيما يلي دراسة وجيزة لهذا الفن وممارسته في ضوء الشعر العربي للإمام عبد الحميد الفراهي.

العروض في اللغة: الناقة التي لم تُرَضْ،[2] من المجاز : ميزان الشعر[3] الناحية،[4] الطريق[5] الغيم[6] مكة والمدينة واليمن وما حولهن.[7]

العروض في الاصطلاح: العروض: "علم يبحث فيه عن أحوال الأوزان المعتبرة"[8] أو "هو ميزان الشعر، به يعرف مكسوقه من موزونه، كما أنّ النحو معيار الكلام به يُعرَف معربه من ملحونه".[9]

فالعروض على وزن فَعُول، كلمة مؤنثة[10] والمراد بها علم يبحث فيه عن صحيح أوزان

[1] نائب مدير تحرير المجلة ومدرس، قسم اللغة العربية وآدابها، سيوري فيديا ساغر، بنغال الغربية، الهند

[2] تاج العروس 378/18

[3] 379/18

[4] 380/18

[5] 381/18

[6] 381/18

[7] 382/18

[8] كتاب كشف الظنون 1133/1

[9] أبو القاسم إسماعيل بن عباد: كتاب الاقناع في العروض وتخريج القوافي، ص 3

[10] الدكتور محمد علي الهاشمي: العروض الواضح وعلم القافية، دار القلم، دمشق، الطبعة الأولى، 1412هـ/1991م، ص 9

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MOTHER'S AUTONOMY AND MATERNAL, NEWBORN AND CHILD CARE IN SOME EASTERN STATES OF INDIA

Ramananda Roy*

ABSTRACT

The role of different dimensions of mother's autonomy is considered to be very significant covariates in India's use of maternal, newborn and child health care services. In order to obtain data from the sample of 54075 women aged 15-49, the National Family Health Survey-4 (NFHS-4) is being used to conduct our research work for India during 2015-16. The research included all women who at the time of the survey had at least one child less than five years of age. For joint estimation of estimation for the corresponding demand functions for prenatal care and the demand function for institutional delivery, we used the conditional Mixed Method along with probit regression to combat selection bias. Two maternal health care parameters are best suited for the Conditional Mixed Phase (CMP): PNC demand and institutional delivery demand. It is widely recognized that women's control over all household resources, exposure to social media and financial issues increase the demand of professional healthcare workers for institutional delivery. The likelihood of taking health care facilities during pregnancy is approximately 17 percent higher than the comparison group of poor women.

Keywords : Autonomy of women; maternal health care; institutional delivery; prenatal care.

Introduction :

The relationship between various attributes of women's autonomy and reproductive activity has not always been compatible across or within cultures; it is clear from the literature. Contradictory associations between women's autonomy and health or fertility outcomes can be responsible for many factors. How to properly conceptualize women's autonomy is the big issue underlying the study of women's reproductive behaviour. Makinwa and Jensen, 1995, and Woldemicael, 2007, stated that the autonomy of women depends on the personal and cultural norms of both women. Concerning the concept and evaluation of women's autonomy, several issues exist. And so many researchers have used indirect measures of the status of women to solve the problem of identifying women's autonomy, such as the level of education, employment status, religion, quality of life, spousal age-difference, family type, etc., in the study of women's autonomy for decision-making autonomy (Jejeebhoy, 1991).

Objectives : To analyze the relationship between the autonomy of the mother and the use of health care facilities for mothers, newborns and children in some eastern states of India.

Hypothesis : The main hypothesis behind the chapter is that women with low autonomy would be less willing to use more health care for mothers, newborns, and children.

Data and Methodology : The secondary data was used for the execution of our research. The primary data source for this research was the National Family Health Survey-4th round of 2015-16 (NFHS-4). Information from a nationally representative sample of 54075 women aged 15-49 years has been obtained by NFHS-4. This research is based on a sample of 54075 currently married women who had at least one birth during the previous four years

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NONLINEAR THERMAL RADIATION AND TEMPERATURE DEPENDENT VISCOSITY EFFECTS ON MHD HEAT AND MASS TRANSFER IN A THIN LIQUID FILM OVER A STRETCHING SURFACE

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Abstract. This paper describes nonlinear thermal radiation effects on MHD heat and mass transfer in a thin liquid film over a permeable unsteady stretching surface taking temperature-dependent fluid viscosity with convective boundary condition. For the non-linearity of the momentum, energy and mass diffusion equations, the problem is solved numerically. At first, Similarity transformations is used to the governing equations to reduce the equations into a set of ordinary differential equations. Then the resulting nonlinear ordinary differential equations are solved using Runge-Kutta-Felberg method with shooting technique. Different physical parameters effects on heat and mass transfer in a thin liquid film are presented graphically. It is found that increase in the unsteadiness parameter leads to increase in the velocity distribution, temperature and concentration gradient. Further, increase in the value of magnetic parameter results in a decrease in the velocity profile and increase in the temperature and concentration gradient. For enhancement of thermal radiation decreases the temperature gradient of the thin film flow. Also, for increase in viscosity variation parameter is to decrease velocity distribution but reverse effects shown in case of temperature and concentration gradient.

Keywords: thermal radiation; thin liquid film; variable viscosity; magnetohydrodynamic; similarity transformation.

2010 AMS Subject Classification: 76N20, 80A20.

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An Introduction to Multi Metric Spaces

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Abstract

In the present paper notions of multi real point and multi metric space are presented and some basic properties of multi metric space are investigated.

Keywords: Multi set, multi point, non-negative multi real point, multi metric.

2010 Mathematics Subject Classification: 54E35, 08A05

1. INTRODUCTION

Multiset (bag) is a well established notion both in mathematics and computer science ([9], [10], [19]). In mathematics, a multiset is considered to be the generalization of a set. In classical set theory, a set is a well-defined collection of distinct objects. If repeated occurrences of any object is allowed in a set, then a mathematical structure, that is known as multiset (mset, for short), is obtained ([18], [20], [21]). In various counting arguments it is convenient to distinguish between a set like $\{a, b, c\}$ and a collection like $\{a, a, a, b, c, c\}$. The latter, if viewed as a set, will be identical to the former. However, it has some of its elements purposely listed several times. We formalize it by defining a multiset as a collection of elements, each considered with certain multiplicity. For the sake of convenience a multiset is written as $\{k_1/x_1, k_2/x_2, ..., k_n/x_n\}$ in which the element x_i occurs k_i times. We observe that each multiplicity k_i is a positive integer. A selective list of references can be given as ([1], [2],[3],[4], [5], [6], [7], [8],[11], [12],[13],[14],[15], [16], [17], [22]).

Classical set theory states that a given element can appear only once in a set, it assumes that all mathematical objects occur without repetition. Thus there is only one number four, one field of complex numbers, etc. So, the only possible relation between two mathematical objects is either they are equal or they are different.

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SOME TOPOLOGICAL PROPERTIES OF MULTI METRIC SPACES

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Abstract. In the present paper some topological properties of multi metric space are studied. In multi metric space, notions of multi open ball, multi open set, multi limit point and multi derived set are presented for the first time.

Keywords: multi metric; multi open set; multi closed set; multi limit point; multi closure; multi derived set.
2010 AMS Subject Classification: 54E35, 08A05.

1. INTRODUCTION

Multiset (bag) is a well established notion both in mathematics and in computer science ([10], [11], [22]). In mathematics, a multiset is considered to be the generalization of a set. In classical set theory, a set is a well-defined collection of distinct objects. If repeated occurrences of any object is allowed in a set, then a mathematical structure, that is known as multiset (mset, for short), is obtained ([21], [23], [24]). In various counting arguments it is convenient to distinguish between a set like $\{a,b,c\}$ and a collection like $\{a,a,a,b,c,c\}$. The latter, if viewed as a set, will be identical to the former. However, it has some of its elements purposely listed several times. We formalize it by defining a multiset as a collection of elements, each considered with certain multiplicity. For the sake of convenience a multiset is written as $\{k_1/x_1, k_2/x_2, ..., k_n/x_n\}$ in which the element x_i occurs k_i times. We observe that each multiplicity k_i is a positive integer.

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MULTI LINEAR OPERATOR ON MULTI NORMED LINEAR SPACE

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Abstract. In this paper, for the first time, notion of linear operator is introduced on multi normed linear space. Boundedness and continuity of multi linear operators are studied along with their various properties. Norm of a multi linear operator is defined and some of its basic properties are investigated.

Keywords: multi linear operator; continuous multi linear operator; bounded multi linear operator; norm of a multi linear operator.

2010 AMS Subject Classification: 46B20, 47A05.

1. INTRODUCTION

Multiset, which is considered to be the generalization of a set, is an important concept both in mathematics and in computer science ([11], [12], [21]). If repeated occurrences of any object is allowed in a classical set then the mathematical structure is called a multiset (mset, for short), ([20], [22]). We formalize multiset as a collection of elements, each considered with certain multiplicity. It is written as $\{k_1/x_1, k_2/x_2, ..., k_n/x_n\}$ in which the element x_i occurs k_i times. We note that each multiplicity k_i is a positive integer.

In classical set theory, an element can appear only once in a set; it assumes that all mathematical objects occur without repetition. Thus, there is only one number zero, one field of

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Spectroscopic, microscopic and antibacterial studies of green synthesized Ag nanoparticles at room temperature using *Psidium guajava* leaf extract

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Abstract—Spectroscopic, microscopic and size dependent antibacterial efficiency of Ag nanoparticles (NPs) synthesized by green approach were studied. Five different samples of Ag NPs having average sizes in the range of ~14 to ~21 nm were synthesized using *Psidium guajava* (Guava) leaf extract (0.25 ml, 0.5 ml, 1 ml, 2 ml, 4 ml, respectively) in 50 ml aqueous $AgNO_3$ solution of molar concentration of 1 mM. The sizes of the NPs were found to increase with increase in concentration of leaf extract. Such increase in NP size is mainly due to the increase in biomolecules, in the solution, that transforms the Ag ions to Ag NPs. Spectroscopic and microscopic properties of as-synthesized Ag NPs were obtained by characterizing the prepared samples using suitable and affordable methodologies. These Ag NPs showed significant size dependent antibacterial effect. The minimum inhibitory concentration and minimum lethal concentration of the sample showing highest zone of inhibition against *Escherichia coli* (*E. coli*) was determined as 40 μg/ml and 80 μg/ml, respectively. Percentage of survivability was also measured through viable plate count. The smallest Ag NPs (average size ~14 nm) considered here produced the best antibacterial activity against the tested *E. coli* compared to Ag NPs having larger sizes at identical bacterial concentration. The enhanced antibacterial efficiency for smaller Ag NPs is mainly due to larger surface area-to-volume ratio of smaller NPs. The probable mechanism of bio-reduction of silver ions and formation of Ag NPs has also been well explained, which justifies the result obtained in this work.

Keywords: Ag Nanoparticles, *Psidium guajava* (Guava) Leaf Extract, Green Synthesis, Characterizations of Nanomaterial, Antibacterial Activity

INTRODUCTION

Metal nanoparticles (NPs) such as Pt, Pd, Au, and Ag have recently gained much attention because of their potential applications in physics, chemistry, and biology [1,2]. Among these metal NPs, Ag NPs or Ag coating system has been considered as a promising material for biomedical applications due to its cost effectiveness and high efficiency in comparison to other noble metal NPs [3,4]. Although from ancient times bulk Ag has been considered to be disinfectant agent [5], but Ag NPs have been broadly used as antimicrobial agent since 2004 [6]. It offers very high antimicrobial effects over a large range of bacteria and parasites [7]. There are numerous examples where Ag NPs were repeatedly used in different medical applications, such as imaging, hyperthermia of tumors and drug delivery [8,9]. Some recent studies also used Ag NPs as anti-cancer agent and the entire observed results show positive effects [10, 11]. The cell killing effect of Ag NPs is size and dose-dependent, as determined by the minimum inhibitory concentration (MIC) and minimum lethal concentration (MLC) against *Escherichia coli*, *Bacillus subtilis* and *Staphylococcus aureus* [12]. The antimicrobial properties of Ag NPs were found to be enhanced for smaller NPs due to large surface area to volume ratio. This is very exciting due to the upward microbial resistance to antibiotics and the development of resistant strains [13]. The fact is that smaller particles with larger surface area can actively release more Ag ions to act. Also, smaller particles have an easier route of endocytosis into cellular membranes [14]. A limited number of studies are available on NP size dependent antimicrobial efficiency of Ag NPs prepared using the green approach. Therefore, the present study of size dependent antibacterial efficiency opens a new avenue in biomedical applications of Ag NPs safely, as NPs are prepared through green synthesis approach. Ag is capable of killing both Gram positive and Gram-negative pathogens. To neutralize bacterial pathogens, coated materials that release Ag NPs were developed. Materials incorporated with Ag are categorized as releasing because of their nature of work. The released Ag ions are the actual agents which destroy microbial pathogen by a versatile mode of action, such as inhibiting DNA replication, disrupting metabolic pathways, lysis of cell membrane, and inhibiting the enzyme system [15]. Ag NPs are multi-faceted in different technologies and can be incorporated into many materials because of their functionality including antibacterial. In the field of controlled drug delivery, hydrogels can be used as a matrix for incorporating Ag NPs with useful biomedical devices for the continuous and slow release of Ag^+ [16]. Ag NPs incorporated with

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Control synthesis of low aspect ratio $Zn_{1-x}Ag_xO$ nanorods using low temperature solution route: Evidence of Ag concentration dependent shape transition

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ABSTRACT

Understanding the effect of doping concentration on the various properties of metal-doped ZnO nanoparticles (NPs) near the shape transition point (sphere to the rod) is essentially required for their possible applications. Given these, we have successfully synthesized spherical to rod-shaped $Zn_{1-x}Ag_xO$ employing a simple chemical route considering Ag doping with concentrations of 1, 2, and 3 mol percentage (%). Although, the shape transition from spherical to rod has been triggered at doping concentration of 2 mol%, the shape transition has been found to be completed for 3 mol% generating nanorods with an aspect ratio of ~1.33. Structural, optical, and antimicrobial properties of $Zn_{1-x}Ag_xO$ NPs show significant changes at the transition concentration of Ag. The shape transition occurs mainly due to the process of synthesis and change in the surface states of the NPs in presence of excess Ag^+ ions in the local environment of the nucleation sites of ZnO.

1. Introduction

Nanostructured materials with different sizes, shapes, surface/interface properties, dimensionality, etc., show many exotic electronic and optical properties [1]. As an optical material, ZnO, especially ZnO nanostructures, has gained much attention recently because of its unique property of a direct wide bulk band gap of 3.37 eV with large (60 meV) excitonic binding energy at room temperature [2]. ZnO nanostructures have been identified as a promising candidate for wide range of applications like in gas sensing [3], short-wavelength optoelectronics [4], UV detection [5], photocatalysis [6], antimicrobial activities [7], and light-harvesting such as solar cells, blue light-emitting diodes (LEDs), and UV-lasers [8] to name a few. The main advantages of ZnO nanostructures are their semiconducting and piezoelectric properties, biocompatibility, and the possibility to grow in a vast range of morphologies [4]. In different noise and vibration minimizing experiments, especially in aircraft, aircraft design to noise simulation is utilized [9], where acoustic sensors also play an essential role. As acoustic sensors, ZnO can be used in aeroacoustic applications due to its excellent dielectric and piezoelectric properties [10]. ZnO has the potential in antimicrobial applications. However, pure ZnO lacks selectivity to antimicrobial activities and others [11]. One-dimensional nanostructures like nanorods of ZnO are preferred as they contain different defect states on the surface [12–14]. By carefully tailoring the surface defects, one can optimize the device performance in the desired applications. In this context, doping of ZnO by different noble metals was found to enhance many of the properties like optical, magnetic, antimicrobial, etc. [15,16] that can enhance the possibility of practical applications of ZnO nanostructures in various fields such as optoelectronics [17,18], catalytic [19] antimicrobial [7], etc. It was

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Bio-synthesis of ZnO nanoparticles and their in-situ coating on cotton fabric using *Azadirachta Indica* leaf extract for enhanced antibacterial activity

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ABSTRACT

ZnO nanoparticles (NPs) of average size of ~36 nm have been successfully synthesised using a low-temperature bio-synthesis method employing *Azadirachta Indica* leaf extract. Also cotton fabrics have been coated *in-situ* during synthesis of ZnO NPs for time durations of 30 , 45 , and 60 min. Amount of ZnO NPs on the cotton fabrics has been found to increase with increase in time. The bio-synthesized ZnO NPs have been found to be crystalline in structure without formation of any impurity phases. The agar diffusion method of antibacterial assay shows that ZnO NPs modified cotton fabrics is more efficient to perform antibacterial effect against Gram-negative bacteria (*Escherichia coli*) than Gram-positive bacteria (*Bacillus subtilis*). It has also been observed that better antibacterial effects are obtained for the fabric samples coated with ZnO NPs with more ageing time. That means, the modified fabrics with more NPs coated in longer deposition time show better antibacterial properties.

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ZnO nanoparticles; *Azadirachta indica* leaf extract; in-situ green synthesis; enhanced antibacterial activity; cotton fabric

Introduction

Microbial activity on fabric leads to unpleasant effects, not only to the fabric itself, but also to the users. Microbial growth on these materials could lead to the discolouration, spot formation, development of unpleasant odours, and promote skin infections. Growth of microorganisms could also damage the fabric strength, develop staining, and discoloration leading to decrease in fabric durability [1,2]. Thus, modified fabrics with antimicrobial properties are interesting raw materials for production of different apparels mainly those that are directly touched with skin, as well as other type of products like curtains, sofa cover, and chairs or bedding linen. In public places including medical related areas microbial contamination is a great concern for public health. Because fabrics could be frequently exposed to pathogenic bacteria, it can lead to nosocomial infections [3,4].

Keeping in mind these issues lots of efforts have been made towards the development of new mechanism for incorporating antimicrobial agents in fabrics that could efficiently prevent bacterial infections [5]. Recently, nanomaterials received considerable attention to the researchers due to their unique as well as new physical and chemical properties. These properties enable to incorporate them in different sectors including medicine, cosmetics, fabrics, and lots of others [6–8]. The intrinsic properties such as large surface area to volume ratio and high surface energy of nanoparticles (NPs) develop the affinity of NPs towards fabric and as a result the lastingness of fabric is increased [9]. So far as the growth and proliferation of microbes on fabric are concerned, nanomaterials are the best choice among all other conventional alternatives nowadays because nanomaterials are economically viable and multitasking, highly stable over a long duration of time, maintain their properties in high temperature and sterilised conditions.

A significant number of research works were being carried out for synthesising the NPs having novel antibacterial properties [10]. In recent times, Peng et al [11] studied the silver nanoparticle modified cotton fabric and its adhesive strength with fabric. The antibacterial effects of metal NPs such as gold and silver are well observed and are reported against a large spectrum of microorganisms [12–14]. For economic feasibility, material scientists are paying their efforts towards antibacterial efficiency of ZnO NPs rather than metals including silver and gold as the former is the economically more viable among them [15–17]. ZnO NPs have a wide range of applications in different sectors including biomedical, cos-

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أبو عثمان الجاحظ

- الشيخ ضياء الدين الإصلاحي[1]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[2]

كان الجاحظ فلسفيًا وكاتبًا حرًّا، وكان غافلًا في شؤون العقيدة، فلم يكن يبالي بالعقائد الدينية. ولكن على الرغم من ذلك كان كاتبًا شهيرًا في اللغة العربية وآدابها، وأديبًا مشهورًا وإمامًا للفلسفة والكلام ومؤلفًا للكتب الكثيرة، فتعتبر أعماله من روائع الأدب ولها سمعة خالدة في اللغة العربية وآدابها، وبهذا الصدد فإنّ شخصيته جليلة جدًا واهتم به المؤرخون والكتّاب المعاصرون له اهتمامًا كبيرًا ولكن لم تسجّل أخبار الجاحظ باللغة الأردوية حتى الآن والمعلومات التي تم العثور عليها بعد البحث ستقدّم في هذا المقال الوجيز.

اسمه ونسبه: أبو عثمان عمرو بن بَحر بن محبوب الكناني الليثي المعروف بالجاحظ، البصري ...... وإليه تنسب الفرقة المعروفة بالجاحظية من المعتزلة.[3]

"وإنما قيل له "الجاحظ" لأنّ عينيه كانتا جاحظتين، والجحوظ: النتوّ، وكان يقال له أيضًا "الحدقي" لذلك".[4]

وبهذا الصدد تروى قصة مثيرة للاهتمام وهي "...أنّ الجاحظ صار إلى منزل بعض إخوانه فاستأذن عليه، فخرج إليه غلام عجمي فقال: من أنت؟ قال: الجاحظ، فدخل

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[1] علم من أعلام الهند، وعالم كبير للدراسات القرآنية والحديثية

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[3] ابن خلكان: وفيات الأعيان وأنباء أبناء الزمان، 108/2، والحافظ جلال الدين عبد الرحمن السيوطي: بغية الوعاة في طبقات اللغويين والنحاة، ص 365، والبغدادي: تاريخ بغداد، 212/12

[4] وفيات الأعيان وأنباء أبناء الزمان، 108/2

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Study on Phenological Diversity of Chlorophycean Algae with its Role in Environment

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Abstract:
The River water algae can resist many environmental stresses. Usually they grow on water if the water is steady but the River water is also contaminated by series of natural reasons. Many genera can grow in the River water. The algae are identified by their shape, size, colour and morphological structure. The physiochemical status of the River water contributes to the phenology of Chlorophycean algae of the River Ganga in Kolkata. Maximum algal population was determined by testing the concentration of algae in the water of the Ganga River. Summer is the season when algal growths are seen at its peak but in the winter the concentration of those algal species are less. But the predominant two species are *Chlamydomonas* sp. and *Dunalliella*sp.
Key-words: Resist, Habitat, Terrestrial, Multicellular.

Introduction:

Algae are the diverse group of autotrophic organism, able to photosynthesis and having motile or non motile unicellular or multicellular forms. It is believed that although the chloroplasts have the single origin but all the algal groups are not originated from a single algal ancestor. Most algae have marine habitat but several algal species have terrestrial habitat as well. Most algae are found abundantly from desert sand to sea water to hot springs and glaciers of ice. They can be flagellated single celled organism or multicellular thallus type structure. The giant kelp of Eastern Pacific which is 60 meters long and deep dense forest like structure is also a type of algal growth itself. The aquatic ecosystems are also dependent on the algae. The primary producers of the ecosystem are algae. The fresh water fishes feed on algal food substances. So the fresh water food chains are highly dependent on algae. During stages of their lifecycle, fishes consume about 75% of algae. The BOD is often provided by the algal biomass of the water bodies. So algae are important to produce fishes in fisheries. The algae produce about 48% of oxygen of the world itself. The algal groups are producing single cell proteins (SCP) now days. The algal growth in the environment depends upon some conditions which are light, pH, temperature, hardness, salinity, phosphorus content, nitrate content and water current velocity for the growth of phytoplankton. Nutrients are the main factor for the growth of algal species. In the River like Ganga River the phosphorus content is predominantly found, which is certainly a trace element for the growth of algal species. Nitrogen is also found to be responsible for triggering a algal bloom. But this factor is more commonly studied in the case of salt sea water. The sources of water nutrients, important for algal growth are divided into two divisions by scientists. The first division is natural sources. And second division is artificial or man-made sources. Natural sources include the sources provided by nature as soil leach nutrients, atmospheric deposited nutrients and nutrients come with a certain water flow. The man-made sources are more complex and highly effective those may be manure, fertilizer, industrial effluents and human sewage. Among all the autotrophs algae secures its significant ranking by versatilities. It has excellent variation in structure. It possesses role in biodiversity and have wild variation of habitats. It is just not enough for algal qualities as there a lot of algal qualities. They have various thallus organizations. The periodic distribution is very hard for this organism which is referred to be phenology. Time to time the researchers has researched upon the algal diversity of Indian subcontinent. Systematic and classification of algae are overviewed by scientists on the basis of their morphology, cytology, biochemistry and recent aspects of biology. An attempt is made to focus on fresh water green algae or River water green algae. So the study is done on Ganga water algae of Kolkata.

EVALUATION OF THE EFFECT OF DEADLY MUCORMYCOSIS IN POST COVID-19 PATIENTS

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ABSTRACT

People of the entire world are fighting against the life-threatening disease COVID-19 during more than one year. In this microbiological war a large number of people have already lost their life, some fighter have won the war and many people have dedicated their life to take the human being to the door of victory in this war. In such a time of disaster another life-threatening disease appears recently, known as Mucormycosis. Mucormycosis, also known as "Black fungus" disease is playing the role of helping hand of COVID-19 to make it winner in this war because it is infecting the recovered or recovering COVID-19 patients. It mainly affects the people with suffering from some severe diseases as AIDS, cancer and mainly diabetes. Mucormycosis is a rare disease but the trending pandemic COVID-19 continues to welcome it to be the successor of next pandemic. It may fetal if it is untreated for long time and it also causes paralysis, seizure like disease. This disease is caused by inhalation of black fungal spore from air or it may occur in the wound skin. The aim of the discussion is to establish the interconnection between COVID-19 and Mucormycosis and giving awareness about the infection.

Key-words: Mucormycosis, Microbiology, Pathology, Pharmaceutical, Biology.

I. INTRODUCTION

Coronavirus disease 2019 (COVID-19) pandemic was first flowed out in Wuhan, china in December 2019 and since then the frequency of bacterial growth and fungal coinfections has been continuously ascending. Flourishing record suggests that patients infected with severe acute respiratory syndrome coronavirus-2 (SARS Cov-2) may develop also in bacterial and fungal secondary infections. In this time, the chance of causing Invasive Pulmonary Aspergillosis (IPA) is high for post COVID-19 causes. It is caused by disclosure to *Mucor*mould which is generally found in soil, plants, manure and decaying fruits and vegetables. It is also found in the nose, mucus of a healthy and normal people. Affects the sinuses, brain and lungs, life threatening in diabetes and cancer patients or people with HIV/ AIDS. Effects to the COVID-19 patients recovering after three weeks. Rhino- orbito- cerebral mucormycosis is considered as the most common manifestation. Here, we described with a patient with his uncontrolled diabetes who treated for COVID-19 but he was read mitted after three-week discharge with a diagnosis of rhinocerebralmucormycosis. COVID-19 patient has high risk of development of mucormycosis as because intake of widespread glucocorticoid to cure COVID-19. This glucocorticoid can lead to cause secondary fungal infection which is mucormycosis. This fungi mainly found in sinuses.

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Cassia roxburghii DC. (Fabaceae; subfamily: Caesalpinioideae); an addition to the flora of West Bengal

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Cassia roxburghii DC. (Fabaceae, subfamily: Caesalpinioideae) is reported here as a new addition to the flora of West Bengal. Taxonomic description of the taxon along with photoplate is provided for easy identification. An image of the herbarium sheet of the taxon is given for authentication. An artificial key is provided for all three species of *Cassia* in West Bengal.

Key Words: *Cassia*, New Record, Harisara, West Bengal

Introduction

The genus *Cassia* L. (Fabaceae, subfamily:Caesalpinioideae) with 32 species present worldwide is mainly distributed in tropical regions of the northern hemisphere (Mabberley, 2018). The genus is represented by 9 taxa in India (Sanjappa & Ambarish, 2020) and 2 taxa have been reported so far from West Bengal (Paul, 2015). *Cassia roxburghii* DC. is mainly distributed in different parts of India viz., Andhra Pradesh, Bihar, Gujarat, Jharkhand, Karnataka, Kerala, Maharashtra, Rajasthan and Tamil Nadu.

During the field visits, two plants of *C. roxburghii* DC. were spotted and collected at Harisara on the way to Ganpur forest in the Birbhum district. A pursuance of recent literature study pertinent to West Bengal including district level floras (Bennet 1979; Debnath *et al*. 2013;Ghosh & Mallick, 2017; Guha Bakshi, 1984; Mitra & Mukherjee, 2013; Paul, 2015; Prain, 1903 and Sanyal, 1994) reveals that the taxon has not been reported from West Bengal earlier. Hence, *Cassia roxburghii* DC. is reported here as a new addition to the flora of West Bengal from Birbhum district. The taxonomic description followed by its phenology and distribution are provided along with a detail photoplate for easy identification. The specimen is deposited in Visva-Bharati Herbarium (VBH), Department of Botany, Visva-Bharati, Santiniketan. The photograph of the herbarium sheet of the taxon is provided for authentication.

Taxonomic treatment:

Cassia roxburghii DC.,Prodr. 2: 489. 1825; De Wit in Webbia 11:226. 1955; Irwin & Barneby in Mem. New York Bot. Gard. 35 (1): 51. 1982; Sanjappa, Leg. Ind. 20. 1991. *Cathartocarpus roxburghii* (DC.) Loud., Hort. Brit. 167. 1832. *Cathartocarpus marginatus* G. Don. Gen. Hist. 2: 453. 1832. *Cassia marginata* sensu Roxb., Hort. Beng. 31. 1814, non Willd. 1809; Fl. Ind. 2: 338. 1832; Baker in Hook. f., Fl. Brit. Ind. 2. 262. 1878.

Plates 1& 2.

Medium-sized trees, 4-6 m high, branches drooping, slender, sulcate. Stem unarmed, with bark greyish, deeply cracked. Leaves bipinnately compound, alternate, paripinnate; petioles 0.8-1.8 cm long; leaflets 13-21 pairs, small, opposite, subsessile, oblong, 2.1-3.5 ´ 0.9-1.9 cm, oblique at base, margins entire, apex obtuse, mucronate, appressed pubescent on both surfaces. Inflorescence axillary racemes, short sub-corymbose, densely flowered; peduncles 5-10 cm long, pubescent; pedicel up to 1.5 cm long; bract persistent, ovate, 0.6-0.7´ 0.4-0.5 cm; two small bracteoles narrowly ovate, 0.2 ´0.1cm. Sepals 5, 0.4-0.6 cm long, brownish pink. Petals 5, sub-equal, 0.9-1.7cm long, pink with shades of red or orange. Stamens 10, all fertile, very unequal; the lower three stamens 2.3- 2.7 cm long with reddish filaments, twice curved but without any swelling at the middle; the four medium sized stamens in the middle 0.7-1 cm long with dark brown anthers & pale yellow filaments; the three upper small stamens 0.3-0.6 cm long with pale brown anthers & bright yellow filaments. Anther basifixed. Pods cylindric, indehiscent, transversely septate, smooth, 20-30 ´ 2-3 cm, brown, many celled with one seed in each cathartic pulp cell. A single pod with 25-35 oblong seeds of 1.0-1.2 ´ 0.7-0.9 cm.

অন্তর্মুখ

সাহিত্য, সমাজ ও সংস্কৃতি বিষয়ক দ্বিভাষিক গবেষণা পত্রিকা

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'সাম্পান'

বাদশাহী রোড, ভাঙ্গাকুঠি, বর্ধমান

সূচিপত্র

অভিজ্ঞানশকুন্তলে প্রতিফলিত তৎকালীন গ্রাম্য জীবনের স্বরূপানুসন্ধান

বিশ্বজিৎ রাজ

Abstract : The play 'Abhijnanashakuntalam', composed by the great poet Kalidasa is regarded to be one of the most popular plays. Although no conclusive evidence has been found, modern researches suggests that, Kalidasa was probably a resident of Vidarbha or Ujjain and he may appeared in a certain period between 1st century BC to 6th century AD. A beautiful description of rural lifestyle emerges in the context of Tapobana in this play. Here the closeness between nature and human life represents the nature as a living entity and also a dramatic character. A beautiful description of the Summer is found in the beginning of this play. A rough idea about contemporary rural environment, plants and animals, marriage system, casteism, womends education, administration and judiciary, tax system, clothing and cosmetics, rituals and beliefs are revealed from deep observation of the play. So this proposed research paper seeks to present a logical and analytical description of contemporary rural lifestyle based on the above mentioned topics.

সাহিত্য পর্যবেক্ষণ : বর্তমান গবেষণা প্রবন্ধটি রচনা করতে বেশ কিছু পত্রাবলী ও সমালোচনাত্মক গ্রন্থের সাহায্য নেওয়া হয়েছে। বিশেষতঃ প্রাথমিক তথ্য সংগ্রহ করতে এবং কিছু কিছু ক্ষেত্রে আলোচনা রীতি অনুধাবন করতে সাহায্য নেওয়া হয়েছে—সত্যনারায়ণ চক্রবর্তী সম্পাদিত 'অভিজ্ঞানশকুন্তম, অনিলচন্দ্র বসু সম্পাদিত 'অভিজ্ঞানশকুন্তম, রমেন্দ্রমোহন বোস সম্পাদিত 'কালিদাস—অভিজ্ঞানশকুন্তম, করুণাসিন্ধু দাস বিরচিত 'সংস্কৃত সাহিত্যের সমাজতত্ত্ব ও অন্যান্য প্রসঙ্গ' ইত্যাদি গ্রন্থগুলির।

মৌলিক গবেষণা : এই গবেষণা প্রবন্ধটির তথ্য বিশ্লেষণ ও শব্দবন্ধ্যান সম্পূর্ণরূপেই মৌলিক। পূর্বে সামাজিক ও সাংস্কৃতিক প্রেক্ষাপটে বর্তমান প্রবন্ধের কিছু বিষয় পূর্ববর্তী গবেষকদের দ্বারা আলোচিত হলেও গ্রাম্য জীবনের প্রেক্ষাপটে 'অভিজ্ঞানশকুন্তলে'র বিশ্লেষণ ও মূল্যায়ন একটি অভিনব পদক্ষেপ।

গবেষণা রীতিবিজ্ঞান : সংস্কৃত সাহিত্যকেন্দ্রিক বর্তমান এই গবেষণা প্রবন্ধটি রচনা করতে মূলতঃ গ্রন্থাগারকেন্দ্রিক ও বিশ্লেষণাত্মক গবেষণা রীতিবিজ্ঞানকেই অনুসরণ করা হয়েছে। তাছাড়া বিভিন্ন অনুজনের পরামর্শও এই তথ্য সংগ্রহ ও বিশ্লেষণে যথেষ্ট কার্যকরী ভূমিকা পালন করেছে।

সাহিত্যকে কাব্যিক ভাষায় জীবন দর্পণ বলা হয়। কারণ কবির কল্পনাইন কল্পনা ও বর্ণনার রঙে সাহিত্য রঙিন হলেও তার প্রেক্ষাপটের মূল রসদ নেওয়া হয় বাস্তব জীবনের অভিজ্ঞতা থেকে। কল্পনার অলংকার সাহিত্যকে রোমাঞ্চিত করলেও বাস্তব জীবন হলো তার প্রাণ। তাই সাহিত্য থেকে তৎকালীন জীবনযাত্রা, সংস্কৃতি, রীতি-নীতি ইত্যাদির যুক্তি সংগত আনুমানিক ধারণা প্রাপ্ত হয়। তবে সাহিত্য থেকে সর্বদাই যে সাহিত্যিকের সমসাময়িক জীবনধারা প্রতিফলিত হয় এমন নয়, মূলতঃ যে সময়ের বিষয়বস্তুকে কেন্দ্র করে সাহিত্য রচিত হয়, সেই সময়ের সমাজের ছবিই ফুটে উঠবে সেই সাহিত্যে, এটাই স্বাভাবিক।[১] কবি কুলকোকিল মহাকবি কালিদাসের সাহিত্যগুলি থেকেও তৎকালীন জীবনযাত্রা, সংস্কৃতি, রীতি-নীতি, পারিপার্শ্বিক পরিবেশ ইত্যাদির ছবি পাঠক মনে ফুটে ওঠে। তবে সেই ছবি অনুসন্ধান ও বিশ্লেষণের পূর্বে সাহিত্যিকের স্থান ও কালের ধারণা তৈরি করা প্রয়োজন। এক্ষেত্রে 'অভিজ্ঞান শকুন্তল' নাটকের রচয়িতা মহাকবি কালিদাসের ব্যক্তি জীবনের স্থান ও কালের গবেষণা লব্ধ অনুমানিক ধারণা তৈরি প্রয়োজন।

সংস্কৃত সাহিত্যিকদের আত্মপ্রচার বিমুখতার ধারাটি মহাকবি কালিদাসও যথার্থরূপে অনুসরণ করেছেন। নিজের জন্মভূমি, আবির্ভাব-লগ্ন, ব্যক্তি জীবন ও পারিবারিক জীবন সম্বন্ধে তিনি সম্পূর্ণ নিরব। তাই কালিদাসকে কেন্দ্র করে তৈরি হয় একাধিক কিংবদন্তী। তবে বর্তমান গবেষণায় কালিদাসের স্থান ও কাল নির্ণয়ের ক্ষেত্রে একাধিক ঐতিহাসিক তথ্য ও গবেষণার ওপর ভিত্তি করে তা নিরূপণের চেষ্টা করা হয়েছে। তবে সে ক্ষেত্রেও গবেষকদের মধ্যে বিস্তর মত পার্থক্য লক্ষিত হয়। এখনো পর্যন্ত সেন স্থির সিদ্ধান্তে উপনীত হওয়া যায়নি। খ্রিষ্টপূর্ব প্রথম শতক থেকে খ্রিষ্টীয় ষষ্ঠ শতক পর্যন্ত দীর্ঘ ৭০০ বছর সময়কালের মধ্যবর্তী বিভিন্ন সময়কালকে বিভিন্ন গবেষণায় কালিদাসের আবির্ভাব কালরূপে প্রতিপাদনের চেষ্টা করা হয়েছে। তাই রবীন্দ্রনাথ ঠাকুর বলেছেন— "হায়রে কবে কেটেগেছে কালিদাসের কাল। পণ্ডিতেরা বিষম করে লয়ে তারিখ সাল।"[২]

বল্লাল সেনের 'ভোজ প্রবন্ধে' কালিদাসকে ভোজরাজের সভাসদ বলা হয়েছে।[৩] রাজা ভোজের সময়কাল খ্রিষ্টীয় দ্বাদশ শতক। তবে অন্যান্য তথ্য প্রমাণের ভিত্তিতে কালিদাস যে এর থেকে অনেক পূর্ববর্তী সময়ে আবির্ভূত হয়েছিলেন তা অনেকটাই নিশ্চিত।

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EFFECTS OF DIFFERENT DRUG BINDING IN STENTED POROUS ARTERY TISSUE WALL: A NUMERICAL MODEL STUDY

Ramprosad Saha

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MSC 2010 Classifications: 35Q92, 92B05, 65M06, 80A20.

Keywords and phrases: Extracellular matrix, Specific receptor, Convection, Porosity, Tortuosity.

Abstract The emergence of drug-eluting stents has proved to be the most efficient methods in treating restenosis following percutaneous coronary intervention. This article deals with effects of specific as well as non-specific drug binding in the homogeneous permeable coronary vessel wall which follows the biodegradable polymer-based medicate conveyance from drug-eluting stents (DES). A three stage is considered, specifically, drug concentration in free phase, drug binding in extracellular matrix phase, and specific receptor phase, non-linear second order saturable reversible binding model. The most reason of the display work is appraisal of the degree of plausibility of modeling of specified non-specific binding within a homogeneous one-layered porous artery wall. A development in axis of symmetry drug delivery model has been noticed. The main focus in this present study consists of the influence of the Peclet number (Pe_T), Damköhler numbers (Da_1 and Da_2) and time dependent discharge kinetics. The outcome of this present work is of increase in tortuosity the diffusivity of drug increases. The present observation also demonstrates the binding in extracellular matrix phase is very low and high enough to specific receptor phase. Hence, the specific and non-specific binding plays a imperative part in the clinical adequacy of conveyed drugs locally, and it must be brought into thought within the levelheaded plan of stent-based conveyance frameworks.

1 Introduction

A drastic reduction has been noticed in the role of in-stent restenosis (a section of blocked artery that was opened up with angioplasty or a stent has become narrowed again) as a result of drug-eluting stents (DES), which releases anti-proliferative drugs into the arterial wall in a restricted manner. It has too revolutionized the treatment of coronary artery disease (CAD) to revive the deterred vessel that has become contracted since of atherosclerosis (a disease of the arteries characterized by the deposition of fats, cholesterol and other substances in and on the inner artery walls). Due to delayed healing of the wound infected during DES implantation, late stent thrombosis remains a safety concern of DES. The bare metal stents (BMS^s) which is active at the time, remains to be inadmissible as it is unable to anticipate in-stent restenosis (ISR). DES is a wire scaffold coated with therapeutic drug. Several DES are now implanted world-wide and various investigations are developed to discuss about its longevity and safety [1]. Now our aim is to describe the mechanism of drug uptake and it's binding within the arterial tissue.

In arrange to control the discharge rate of drug concentration, the coating may incorporate a rate-limiting impediment. To guarantee viable persuance of DES, the geometry of stent as well as coating design needs to be advanced such that restorative levels of drug are conveyed to the artery for the desired period of time [1]. When the drug is distributed in arterial tissue, the receptors bind the drug. Since, the bound drug becomes pharmacokinetically inactive, so it cannot produce its toxic effect and there are two types of binding, one is specific binding due to the specific receptor (SR) and the others is non-specific binding due to the extracellular matrix (ECM). The amount of drug eluted from the stent decides the success of anti-proliferative therapy from DES. Though, in most of the patients drug-eluting stents are the main alternative of percutaneous coronary interventions (PCI^s), its longevity and safety factors are still questionable.

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SPECIFIC AND NON-SPECIFIC DRUG BINDING ELUTED FROM A HALF-EMBEDDED CARDIOVASCULAR DRUG-ELUTING STENT AND ITS RETENTION IN POROUS VESSEL WALL : A NUMERICAL MODEL STUDY

RAMPROSAD SAHA

(*Received 25 January 2022 and revision received 17 March 2022*)

Abstract. This article deals with the impact of specific and non-specific binding and retention of drug delivered from a half-embedded drug-eluting stent within side the artery wall in appearance of atherosclerotic plaque. A two-species drug shipping system (unbound segment and bound segment) has been considered. A two-dimensional axis-symmetric system of drug deliverance from the stent struts has been enhanced. The transportation of unbound drug is modeled as an unsteady convection-diffusion-reaction process, whereas the bound drugs are an unsteady reaction-diffusion process. A numerical specific finite-difference scheme has been carried out to solve the governing equations of motion along with the set of preliminary and boundary conditions. Our aim is to describe the influence of Peclet number, Damköhler number and equilibrium dissociation constant at the drug shipping of unbound in addition to bound phases which are discussed graphically. The outcomes reflect that the drug progressively binds to specific receptor and extracellular matrix sites until the saturation of binding sites takes place. It is also noticed that the low diffusivity drug rapidly bounded in binding sites with high compatibility.

2010 Mathematics Subject Classification : 35Q92; 92B05; 65M06; 80A20

Keywords and Phrases : Atherosclerotic plaque, Half-embedded DES, Specific binding, Non-specific binding, Peclet number, Damköhler number, Marker and cell (MAC) method.

1. Introduction. In the present day world, cardiovascular disease is one of the major causes of mans death. The most common of them is a case of atherosclerosis, which occurs due to the accumulation of fat in the arterial wall. The early levels of the disease start with an extraordinary aggregation of cells and macrophages containing

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Research Article

An Introduction to Multi Inner Product Spaces

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Abstract. In this paper, for the first time, notion of multi complex numbers and multi complex number valued inner product is introduced in multi linear (vector) space. Starting from the definition, some basic properties of multi inner product spaces are studied along with examples. Multi number valued parallelogram law and polarization identity are established in multi inner product space.

Keywords. Multi linear space, Multi complex number, Multi inner product, Schwarz inequality, Parallelogram law, Multi Hilbert space

Mathematics Subject Classification (2020). 46C05, 46C50

1. Introduction

Multiset has become an important concept and being widely used both in mathematics and in computer science ([7], [8], [22]). If we allow repeated occurrences of any object in an ordinary set, then the mathematical structure is called a multiset (or mset), ([20], [21]). Formally, a multiset is defined as a collection of objects with certain multiplicity to each element and is written as $\{m_1/a_1, m_2/a_2, \ldots, m_n/a_n\}$ in which the element a_i occurs m_i times. We also observe that each multiplicity m_i is a positive integer.

Classical set theory assumes that all mathematical objects occur without repetition. But, the real physical world has enormous repetition. For example, many carbon atoms are there, many water molecules, many strands of RNA, etc.

Multiset theory, real valued multisets and negative membership of the elements of multisets were studied by Blizard ([1], [3], [2], [4]). Girish and John developed the concepts of multiset

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Fabrication of MnO_2 Nanoparticles from Simple Pyrolytic Method for Degradation of Methylene Blue Under Visible Light Irradiation

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ABSTRACT

α-MnO_2 nanoparticle with semi-tubular morphology was prepared pyrolytically using $[Mn(pyo)_2(dca)_2]_n$ as a sole precursor at 700^{O}C in air for 2 h without applying any catalyst or template. This nanostructure was systematically characterized physically by Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction spectroscopy (XRD), scanning electron microscopy (SEM) and thermal gravimetric analysis (TGA). The prepared α-MnO_2 displayed high photocatalytic activity toward decolorization of methylene blue (MB) dye under visible light irradiation in assistance with H_2O_2. The result obtained indicated that almost 84% colour removal occured within 2.40 h.

Keywords: Manganese oxide, Nanoparticles, Pyrolytic technique, Photocatalytic activity.

INTRODUCTION

Most of the wastewater of textile industries contains large quantities of azo compounds. Discharge of such harmful chemicals may contaminate into our surface water and cause serious water pollution.[1] The consequence of such environmental carcinogens in defiled water has been extensively studied.[2] Considerable research efforts were carried out to remove the colour of untreated effluents from textile industries. These include several chemical, physical as well as biological methods, such as chemical coagulation [3], anaerobic and aerobic[4], microbial degradation[5], use of activated carbon[6], biosorption[7], chemical oxidation[8], deep-well injection, incineration, solvent extraction and irradiation[9–12] etc. Among the several elegant techniques, Advanced Oxidation Process (AOP) is the most promising advancement *via* the generation of highly active radicals which are very effective for oxidizing most hazardous organic compounds into harmless products.[13,14] Catalytic oxidation process has emerged as one of the most efficient methods as it involves effective mineralization of organic substances.[15]

Manganese oxides nanomaterials attracted much attention due to markedly increased surface area as a consequence of greatly decreasing size.[16,17] These nanomaterials show wide application in various fields, especially, wastewater treatment, catalysis, biosensors, ion-exchange, molecular

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RESEARCH ARTICLE

Role of Ag Nanoparticles on Photoluminescence Emissions, Antibacterial Activities, and Photocatalytic Effects in ZnO-Ag Nanocomposites Synthesized via Low Temperature Green Synthesis Method Using Azadirachta Indica Leaf Extract

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ABSTRACT

A facile synthesis of ZnO–Ag nanocomposites (NCs) and their photoluminescence (PL), antibacterial and photocatalytic activities have been reported. Three different samples of ZnO–Ag NCs were prepared by varying the amount of biogenic Ag nanoparticles (NPs) in a fixed concentration of ZnO NPs. The formations of NC along with its associated properties were confirmed through various contemporary characterisation techniques. An enhancement of the ultraviolet PL emission with a corresponding reduction of visible PL emission was found with increase in the content of Ag in the NCs. Result of antibacterial assay showed that ZnO–Ag NCs were more efficient to perform antibacterial effects for Gram-negative bacteria than the Gram-positive bacteria. It was also observed that the NC having higher amount of Ag exhibited better antibacterial effects for both types of bacteria. The excellent photocatalytic activity was also observed for the NCs showing the highest antimicrobial effects among the samples.

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ZnO–Ag nanocomposites; green synthesis; enhanced UV emission; enhanced antibacterial activity; efficient photocatalytic activity

Introduction

The rapid development of modern technology necessitates materials possessing exceptional combination of properties viz. high thermal and mechanical stability, desired optical properties, enhanced antimicrobial activity, biodegradability, etc., which cannot be achieved by individual materials [1]. These multifunctional properties are executed by composite materials which is a combination of two or more materials that provides upgraded novel properties as compared to its individual component. Nanocomposites (NCs) received significant attention in the arena of material research because of their unique physical, chemical, mechanical, optical, electrical and magnetic properties which allows them to be used in a wide range of applications [1,2]. Again, indiscriminate production and unscientific use of drugs result in development of multiple antibiotic resistant strains (MARSs) leading to serious issues of health hazard [3]. In this connection, nanomaterials being an excellent antimicrobial agent had received much attraction by the scientific community due to their unique antimicrobial property, small size along with high surface-to-volume ratio and strong affinity towards different microbial pathogens [4,5]. Metal and metal oxide nanoparticles (NPs) are considered to be one of the choices for beneficial antimicrobial agents due to their high chemical stability, good conductivity, promising photocatalytic activity and most crucial antimicrobial to anti-inflammatory properties [6–9]. In view of future adversity, production of a cost-effective antimicrobial agent with enhanced photocatalytic activity has gained significant importance for the researchers due to their numerous applications not only to the bio-medical area but also in different industrial sectors including water treatment, textiles industry, cosmetic industry, food processing, solar cell, photovoltaic application and many others [10–14].

In recent time, a lot of research works have been performed to study the antimicrobial activity along with other multifunctional properties of various NPs and NCs [15–19]. From the ancient time Ag has been serving as a promising material in the domain of antimicrobial and medicine [20]. Ag NPs show significant antimicrobial effect over a wide range of microorganisms [21]. ZnO is also being observed as an antimicrobial agent in both of its micro and nano forms and less expensive as compared to Ag. Thus combining a small amount of Ag NPs with comparatively less expensive ZnO NPs resulting in enhanced photocatalytic and antimicrobial activity would be

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Estimation of Biological Toxicity by Copper oxychloride on *Pisum sativum* L. and *Vigna radiata* L.

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ABSTRACT

Background: This research work describes about toxicity estimation of commonly used fungicide copper oxychloride using *Pisum sativum* L. and *Vigna radiata* L. as a bioindicator.

Methods: The seeds of *P. sativum* and *V. radiata* were treated with different concentrations of fungicide. Biological toxicity measured by seed germination percentage, R/P ratio, total leaf chlorophyll, total leaf proline, total seed protein, mitotic index, abnormality index and mitotic inhibition.

Result: Linear regression analysis showed that seed germination percentage, total seed protein, abnormality index and mitotic inhibition show positive correlation with increasing concentration of fungicide copper oxychloride. The R/P ratio of 4th and 8th days, mitotic index, total leaf chlorophyll and leaf proline have negative correlation along increasing concentration of fungicide. However total leaf proline of *V. radiata* at 2% concentration of fungicide is abruptly higher than control and other concentrations. The application of copper oxychloride at lower concentration can be used as a safe fungicide.

Key words: Copper oxychloride, Leaf proline, *Pisum sativum*, R/P, Seed germination, Seed protein, *Vigna radiata.*

INTRODUCTION

The present century has witnessed the dependence of society on the products of chemical industry to provide food and other necessities to uplift our quality of life. The overpopulation, limitation of agricultural fields, food shortage in whole world need to produce more crops in a limited area. But so many types of fungal diseases like Powdery mildew of *Vigna radiata* caused by *Erysiphe polygoni* (Ganesha, 2000; Suryawanshi *et al*., 2009), *Cercospora* leaf spot of *Vigna radiata* caused by *Cercospora canescene* (Khunti *et al*., 2005) and fungal disease like wilt disease of Red gram (*Cajanas cajan*) caused by *Fusarium oxysporum* (Raju *et al*., 2008), which cause yield loss of pulse grains. Therefore commercially many types of fungicides have been formulated for management of fungus in the crop fields and home gardens. They act quickly to cure fungal disorders to increase the rate of production. The widespread use of these fungicides may cause environmental and food contaminations (Tort and Turkyilmaz, 2003; Fisun and Rasgele, 2009). Adoption of conservation agriculture was found to be climate smart agricultural technique (IARI, Annual Report 2017-18). The first landmark in the control of phytopathogens is the discovery of Bordeaux mixture by P. M. A. Millardet in 1885. After that, Copper based compounds emerged as the most successful fungicides. Copper is an essential nutrient for plant, it plays an irreplaceable role in the function of a large number of enzymes which catalyse oxidative reaction in a variety of metabolic pathways (Lolkema and Vooijs, 1986; Marschner, 1995). However when absorbed in excess, copper can lead to inhibition of plant growth (Reboredo and Henriques, 1991; Ouzounidou, 1994), inhibition of root elongation, disturbance of mitosis (Fiskesjo, 1988) and damage root epidermal cells and root cell membrane (Ouzounidou *et al*., 1995). Pesticide toxicity results in reduction of chlorophyll and protein contents, accompanied by decreased photosynthetic efficiency of plants (Sharma *et al*., 2019). One of the copper based fungicide is Copper oxychloride (commercial name Blitox) was used against *Alterneria* leaf and flower blight of Marigold (Jash *et al*., 2004).

Peas are used as a field crop in 3 main areas: human consumption, livestock fodder and as a source of hay (Afonin *et al*, 2008). Pea is highly susceptible to pre emergence damping off and after emergence root and foot rots caused by soil borne and seed borne fungal infection (McPhee, 2003). The Mature mung bean seeds and flour is used in variety of dishes and sometimes grown for fodder, green manure, cover crop (Mall, 2017).

The current study was designed due to nutritional importance of *Pisum sativum* and *Vigna radiata* to explore the effect of copper oxychloride (a blue labeled fungicide) on their germination, growth parameters, chromosomal abnormalities and biochemical changes on growing

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Biosorption of heavy metal by bacteria for sustainable crop production

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ABSTRACT

In eco-system population several heavy metals play important roles those are spread from the domestic and industrial wastes, causing huge crop damage by damaging plant tissues. The collected heavy metal tolerance bacterial samples from agricultural lands of Durgapur zone, West Bengal, India against Molybdenum, Lead, Cobalt and Zinc are observed as *Proteus* sp. *Klebsiella* sp. and *Bacillus* sp. *Pseudomonas* sp. and *Staphylococcus* sp. as predominant. Demonstrated some confines displayed high protection from heavy metals with at least Minimum Inhibitory Concentration (MIC) for weighty metals as 80 μg/ml for Molybdenum, 160 μg/ml for Lead, 140 μg/ml for Cobalt and 1200 μg/ml for Zinc. In this study we noticed a relationship between substantial metal opposition and anti-microbial resistance in bacterial samples. The heavy metal free samples of *Triticum aestivam* showed batter results in root length and shoot length than the heavy metal contaminated samples.

Selection and peer-review under responsibility of the scientific committee of the 1st International Conference on Computations in Materials and Applied Engineering – 2021.

1. Introduction

Globally, Environmental pollution brought about by weighty metals through anthropogenic and mechanical exercises has made significant unsalvageable harm the biological system. Among the various pollutants, heavy metals are released from the activity of industries such as smelting, mining, combustion of fossil fuel in soil and water [1,2]. In addition, agricultural activities such as application of agricultural land and sewage sludge in agricultural areas also add sufficient metals in the soil [3–5]. In addition, heavy metals such as Zinc, Cobalt, Lead and Molybdenum have been found to be the most toxic pollutants. The toxic metal pollution is a major concern, as these hazardous pollutants are accumulated in living organisms including microbes, plant, animal and human and are responsible for many physiological and metabolic disorders and in some cases plant tissues are damaged [6–8]. Substantial metal becomes poisonous when they aren't processed by the human body and collected in delicate tissue [9,10]. The increase in metallic toxicity is considered to be one of the main causes of limitation of plant growth. So, that's important to restore the heavy metal contaminated environments for both environmental and economical sustainability. Among these it is imperative to consider local microbes on weighty metal tainted destinations [11,12]. Unnecessary collection of weighty metals on agrarian land through wastewater system can be sullied as well as can be substantial metals are take-up by harvests and accordingly influence food quality and wellbeing [13,14]. In the environment microorganism are usually affected by the discharge of heavy metals. Microbial ecosystem can drastically change the fate of metals inserted into aquatic or metallic soil environment [15]. Yeast, fungi, algae, bacteria and some aquatic plants have been shown to have the ability to thicken metals from dilute aqueous solution and to accumulate inside the cell structure. Many microorganisms have developed resistance to toxic metal ions to survive in heavy contaminated environment [16]. These mechanisms include: impermeability of the metal, active transport of the metal away from the cell organism, metal bypass mechanism, extracellular sequestration, enzymatic a less toxic form metal is unnecessary and decreasing the metallic sensitivity of cellular targets, which may be directed against one of the detoxifications processes a group of metals or chemically related metals. Besides, the detoxification process may vary depending on the variety of microorganism [17,18]. This transformation of pollutants is an incidental response is catalyzed by the enzymes present in the cell metabolic system [19,20]. In this work we are noticed that the heavy metals stress on bacteria,

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Exploring True Knowledge from a Scientific and Philosophical Standpoint

Dr. Dinesh Kumar Das*

Dr. Abhijit Sen**

Abstract

Concept of Knowledge and that of True Knowledge are explored. Differences of Information and True knowledge are investigated. Means of achieving true knowledge are outlined. A critical analysis tries to unravel the mysteries of true knowledge. This study explores a new direction of knowledge with reference to ancient texts like Muṅdakopaniṣad, Vedāntasāra and Tarkasaügraha Dipika.

Keywords: True Knowledge, Information, Para vidya, Apara vidya, Perspective

Introduction

By *information* we understand facts or descriptive details about someone or something. By knowledge we mean things that are believed to be true in a given context or in other words, justified true belief about something in a specified situation. Clearly, knowledge depends upon the context i.e under the prevailing situation[1]. But then, it could change if the prevailing situation be altered. Therefore ordinary information or knowledge cannot be proclaimed to be absolute or unchanging. This brings us to define a type of knowledge that is true always independent of any context or condition or reference frame.

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1. http://www.happinessofbeing.com/hab-ch05.html, Happiness and the Art of Being, Chapter 5: What is True Knowledge?

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Analysis of heavy metal-induced toxicity on the successful development and hatching of grasshopper

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Abstract
Heavy metals toxicity is a significant concern for primary consumers, like grasshoppers. In a lab setting, the effects of $HgCl_2$, $CdCl_2$, and $ZnCl_2$ on egg hatchability and embryonic duration of *Oxya hyla hyla* and *Oedaleus abruptus* (*Acrididae*) species were investigated. The same-aged healthy eggs were incubated in sand that had been exposed to various quantities of the metals. When metal concentrations in both experimental species increased relative to the control, egg hatching considerably decreased. Similar patterns were also seen when looking at the length of the embryonic duration.

Keywords: heavy metals, egg, hatchability, embryonic duration

Introduction

Heavy metals are one of the many environmental hazards that organisms can face. Heavy metal pollution comes from a variety of sources, including mining (Navarro *et al.*2008) [9], smelting procedures (Brumelis *et al.*1999) [2], and agriculture (Vaalgamaa *et al.*2008) [11]. In addition to these, the natural activity, chemical and metallurgical industries are the most important pathways for heavy metals in the environment (Cortes *et al.* 2003) [4]. Dust fall, bulk precipitation, and gas or aerosol adsorption are the three main mechanisms by which heavy metals are transported from the atmosphere to the soil (Andersen *et al.* 1978) [1].

Eggs are the first life stage of a new generation and the embryonic development is very important in insect life history. In grasshoppers, eggs are immobile and remain in contact with soil; they cannot surpass environmental pollution. Like adult ones their resistance to soil pollutants might be relatively weak (Devkota and Schmidt, 1999) [5]. Hatching of eggs is an important event in insect reproduction. Hatching success depends in part on the quality or health of the embryo in an egg. Because pores and tiny channels in the egg hull allow egg respiration and water uptake from the environment, heavy metals in soil may enter eggs along with water that are toxic to embryos and consequently reduce hatching success (Xu *et al.*2009) [12]. These noxious substances in the soil influence the vitality and reproduction of grasshoppers, and eggs laid in heavy metal loaded soil exhibit a marked reduction in hatching rate (Schmidt *et al.*1991; Devkota and Schmidt, 1999) [10, 5].

One approach to study the effects of heavy metals on eggs is to expose healthy eggs to different concentrations of metals in soil and measure effects on hatching success. In the current study, healthy eggs of *Oxya hyla hyla* and *Oedaleus abruptus* (Orthoptera: Acrididae) were exposed to soil containing Hg, Cd, and Zn at varying concentrations in a lab setting. The hatching success and embryonic duration of the exposed eggs were then recorded.

Materials and Methods

Insects and eggs

Oxya hyla hyla and *Oedaleus abruptus* were obtained from the insectaria of Entomology Research Unit of the Zoology Department in Visva-Bharati University, Santiniketan, India. Mass culture procedures suggested by Haldar *et al.* (1998) [6] were implemented with minor adjustments in order to generate a colony of the desired acridid species. Same aged individuals were separated and allowed to oviposit in sterilized sand trays and collected with special care within an hour after oviposition.

Preparation of sterilized sand

Sand (approximately 0.05 mm diameter) was collected from the bank of Mayurakshi river, near the Department of Zoology, Suri Vidyasagar College. To eliminate any soil or metal particles connected to the samples, they were carefully cleaned with filtered water and ran under running tap water. After washing the sand was oven dried and kept for the experiment.

Experimental set up

The experimental set up was followed by the method of Malakar *et al.* (2009) [8] with slight modifications. Grasshoppers lay eggs in moist soil. To recreate such an environment for the experiment, sand was provided as

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Present Status of Entomophagy in India

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ABSTRACT

Eating insects is a very widespread behaviour in many cultures all over the world. In India, insects are used in a variety of ways by tribal people, including as food, medicine, and ornaments. For tribal people, edible insects are a healthy, renewable food supply that has positive effects on the environment, the economy, and nutrition. Insects are a more affordable source of protein than meat and fish because of their high protein content and ease of digestion. They also contain certain minerals, vitamins, lipids, and carbohydrates. Famed ethnic groups choose food insects based on their cultural practices, culinary preferences, accessibility, and various phases of development. Indian tribal people frequently eat insects in many different regions. Coleopteran species are considered the most out of these edible insect species, accounting for roughly 34% of total consumption, followed by Orthopteran (24%) and Hemipteran (17%), Hymenoptera (10%) and Odonata (8%), Lepidoptera (4%), Isoptera (2%), and Ephemeroptera (1%). Insect consumption has been important in terms of nutrition as well as biological control, which is significantly superior to the use of pesticides and other approaches in terms of costs and environmental implications.

Key Words: Entomophagy, Insects, Food, Tribals, Nutrition, Biological Control

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INTRODUCTION

Eating insects is a practice known as entomophagy. Many nations throughout the world consider insects to be true food sources for people. Numerous tribes in India have been doing this for ages. However, as Motshakeri has demonstrated, such ancient behaviours are uncommon, and the available evidence, particularly with relation to India, is fragmented and limited. In the near future, entomophagy needs to be revalidated and pushed because food scarcity in India is getting worse by the hour [1].

More than 65 percent of people in India live in rural areas where there is a concern with food security [2]. The overall amount of food that India would need to produce by 2030 is estimated to be roughly 355 million tonnes. However the amount of food that is available will be insufficient in future. The suffering has been made worse by inefficient food distribution and expensive food. Additionally, he examined the current state of entomophagy globally and advocated for its revival in areas where there is a severe food crisis.

Edible insects are a sustainable natural food supply with health, economic, and ecological advantages for people all over the world. Insects are the ideal food because of their high protein content, digestibility, and combination of minerals, vitamins, lipids, and carbohydrates. In contrast to fish and meat, insects are really the most affordable source of protein. Entomophagy is currently, however, a less widespread practice. As food scarcity in India worsens on a daily basis, entomophagy needs to be revalidated and pushed in the near future.

Between 8°4' and 37°6' north latitude and 68°7' and 97°25' east longitude, India is located north of the equator. It is the seventh-largest country in the world, with a total area of 3,166,414 square kilometres (1,222,559 square miles) and a population of approximately 1210.2 million people, including 645 different tribes. More than 65 percent of the population also lives in rural areas. Its distinct geoclimatic characteristics support a wide variety of living things. India is a tropical country, hence there are more different kinds of insects there. 584 families and 51450 species of insects have been recorded from India [3]. Alfred et al. identified 59353 species of insects from India, divided them into 619 groups, as part of another estimate [4]. As a result, using insects as a bioresource could be possible in India.

The fundamental issue in this scenario is that although locals have a wealth of ethno-entomological knowledge that has been passed down orally from generation to generation, those outside the

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Full Length Research Article

Analysis of Plant-based Registered GI Products of West Bengal

Shamim Alam[1], Sandipan Chatterjee[2] and Anirban Paul*[3]

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ABSTRACT

Geographical indication (GI) is an important type of Intellectual Property Rights. In the last two decades it has emerged as a significant tool that provides the right to use the indication for the product to their manufacturers or producers from any particular region. The GI of any particular product provides them the legal right to ban the use of the name or sign which doesn't have certain qualities and characteristics. There were 417 registered GI products in India including 390 Indian products and 27 foreign products till 31st March, 2022. Darjeeling Tea of West Bengal was the first product that was registered under GI in India in 2004-05. Among 390 Indian GI products 22 are from West Bengal. The present paper analyses the plant-based registered GI products of West Bengal starting from Darjeeling Tea to Dalle Khursani. The raw material of Darjeeling tea is the leaves of *Camellia sinensis var. sinensis*. Dalle Khursani is a round shaped chili which is one of the hottest chilies in the world belonging to the plant genus *Capsicum* has recently been given GI tag in 2021-22.

Key words: *Camellia sinensis*, Foodstuff, Geographical indication, Handicrafts, Intellectual property

Geographical Indication (GI) is a sign used on goods that have a particular geographical origin and assured quality [1]. A milestone was reached when World Trade Organization (WTO) through Trade-Related Aspects of Intellectual Property Rights (TRIPS) had granted goods to retain its essence of the land by allowing attaching a geographical indication to goods having specialty from the place of origin [2]. In India, the first specific law that provides for the registration and protection of GI came in the form of Geographical Indication of Goods (Registration and Protection) Act in 1999. The GI of Goods Act came into force on 15th September 2003 [3]. For the first time the Government of India under this act has established the GI Registry office at Chennai under the Controller General of Patents, Designs and Trade Marks. Thus, GI is an IPR (Intellectual Property Rights) which provides the recognition and protection to community for well-known, place specific natural or man-made products as the goods as per sec 2(f) of the GI Act 1999 by GI Registry in India [4]. It acts as an effective tool in protecting and rewarding not only the market potential of elite items but also the traditional knowledge associated with them. It is the exclusive right that producers have to use the indication for their products originating from that particular region. In other words, they have the legal right to prohibit any unauthorized use of the sign on a product that is not from that particular area or which does not have the assured qualities guaranteed by the GI [5].

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There were 417 registered GI products in India including 390 Indian products and 27 foreign products till 31st March, 2022. GIs have been tagged in West Bengal for a wide variety of products. Among 390 Indian GI products 22 are from West Bengal [6]. Darjeeling Tea of West Bengal was the first product that was registered under GI in India in 2004-05 [7]. The latest product that has registered GI Tag from West Bengal is the Dalle Khursani. It is one of the hottest red chilies in the World exclusively grown in Darjeeling and Kalimpong district of West Bengal as well as in Sikkim state. Both Sikkim and West Bengal jointly got GI tag on it [6]. The present paper provides an overview of the current scenario of GI products of West Bengal with its plant based raw materials.

MATERIALS AND METHODS

The study area of the present paper is West Bengal which extends from 27°13'15"N to 21°25'24"N latitude and 85°48'20"E to 89°53'04"E longitude. It is located in Eastern India and is the 4th most populous state in India. The total area is 88,752 km^2 out of which 11,879 km^2 (13.38%) is under forest coverage. Its Landforms are very diverse kind having mountains, plateaus, hills, plains as well as sandy coastal area. West Bengal has everything- a state needs to flourish. West Bengal is bound by the Himalayas, Sikkim state and Bhutan in the north; Bay of Bengal in the south; Odisha in the southwest; Jharkhand and Bihar in the West; Nepal in the northwest; Assam in the northeast and Bangladesh in the West. The average normal rainfall for the state is 1830mm [8].

The present paper aims to study the plant-based GI products of West Bengal based on secondary data collected from journals, magazines, newspaper articles, Govt. reports and

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Entomophilic pollination of *Foeniculum vulgare* Gaertn

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Abstract
The seeds of *Foeniculum vulgare* Gaertn. (Apiaceae) are used as spice as well as important medicinal purpose which is also famous in Bengal as Pan-mouluri as it is also used with beetle leaf. The seed production is depended on the successful pollination where insects played a major role as pollinators. Present investigation deals with the flower-visitors (insects) interaction, pollen production, pollen dispersal and pollination of *Foeniculum vulgare* Gaertn. The yellowish flowers appear during December - March. Flowers generally open in the morning (05:30-07:00 hrs.) and anther dehiscence takes place after flower opening. Each bisexual flower contains 5 anthers which produce a total 9850 pollen grains in average. After flower opening different insect flower visitors like members of Diptera (Flies, Syrphid flies), Hymenoptera (*Apis dorsata, Apis cerena indica, Xylocopa* sp., *Amegilla* sp., *Vespa* spp., Wasps, Ants etc.), Lepidoptera (Butterflies) and Coleoptera were found to visit the flowers for collecting their forage. During their visit they carry a considerable amount of pollen grains and transfer to other flowers for successful pollination for seed production. Among the visitors *Apis* spp. and *Vespa* spp. pay continuous visit for enhancing the pollination rate. The fruit production is considerably low when the insects were excluded which suggested the significant role of various insects for successful pollination.

Keywords: flower- visitors, *Foeniculum vulgare*, fruit set, insects, pollen dispersal, pollination

Introduction

Floral visitor insects are dependent upon nectar and pollen for their nutrition. Among different groups of flower visitors' insects are predominant. They visit to millions of flowers and have been considered as potential pollinators following the rules governing co-evolution and pollination systems between conspecific plants and their pollinators (Bhattacharya and Mandal, 2000) [3]. Lack of adequate floral resources may lead to weak interaction between plants and their appropriate pollinators, which in turn causes lower limits of flower visits and pollination success.

Pollination is a vital phenomenon in the sexual reproduction of flowering plants. It is a simple process of transferring of male sexual parts to the female reproductive structure of a plant. This process involves three phases- release of pollen, transfer of pollen grain with the help of certain vectors (biotic or abiotic) and placement of pollen for effective fertilization, all of which occur in succession. Faegri and Van der Pijl (1980) [12] provided a number of examples on floral visitors, floral resources and its dependence upon pollination and fruit set. There might have a correlation between nectar secretion and entomophilous nature of dioecious plants. Role of foraging dynamics and floral sex allocation on fruit set of certain plants were documented by Brunet and Charlesworth (1995) [6] and Willis and Kevan (1995) [32] respectively. Dafni and Giurta (1999) [9] reported about functional significance of plant-pollinator interactions in relation to floral symmetry and nectar guides. Lughadha and Proenca (1996) [16] showed increased pollinators population in presence of nectar and pollen abundance. Strauss (1997) [29] showed the relation between floral characters, pollinators and plant fitness; while Dafni and Giurta (1999) [9] enriched the literature by focusing the functional ecology of floral guides in relation to insect behavior and vision. Reproductive system of Apiaceae has been investigated by Bell (1971) [3], Webb (1979) [30], Lindsey (1982) [14], Schlessman (1982) [28], Koul *et al.* (1989) [13], Shilpa *et al.* (2014) [27] and Bharti *et al.* (2015) [4]. These investigations notwithstanding the interaction between flower-visitor interaction and pollination in *Foeniculum vulgare* of the family Apiaceae have received little attention. Our observations on *Foeniculum vulgare* have generated results which highlights this interaction.

Thus the present investigation has been done to determine the relation between the floral biology and insect flower visitor interaction.

Materials and Methods

Foeniculum vulgare Gaertn. is under the family Apiaceae or Umbelliferae is very common cultivated plants has grown all over the West Bengal. The study was conducted following the method of Mathur and Mohan Ram (1986) [18], Reddi *et al.* (1989) [24] and Mondal *et al.* (1992) [20] to observe different phenological events of same species growing at around Bolpur-Santiniketan, Birbhum (23.6712° N, 87.6919° E). Following Mandal and Chanda's approach (1981) [17], the number of pollen grains per anther and per flower was measured. A pollen ovule ratio of a flower was calculated by the method of Cruden (1977) [8]. Pollen viability has been evaluated by T.T.C (2,3,5- tri phenyl tetrazolium chloride) staining techniques (Dafni and Firmage 2000) [10]. Netting and bagging of flower was carried out to determine the role of air and insects in pollination by Reddi and Janaki Bai (1981) [25].

Results and Discussion

These plants are erect annual herbs and having some medicinal property. In India and neighboring countries, the seeds of the plants are used as masticatory and for chewing alone or in betel or paan. Additionally, it is used for thirst,

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An overview on bio-pollinators in present scenario

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Abstract
The study of pollination biology teaches about the various pollinators in different seasons. Tiny pollinators such as ants, alkali bees, beetles, hoverflies, solitary bees, beetles, and bumble bees have been found to have decreased pollination frequency as a result of the heavy and irregular use of pesticides and fertilizers. Three families, Fabaceae, Malvaceae, and Apiaceae have revealed newer and newer types of pollinators engaged in pollination. Pollinators such as *Xylocopa* sp., *Plebejus* sp. (Silver studded Blue), *Lycaena* sp., and *Oplodontha* sp. have been found to be dominant pollinators, and birds are also used to cause pollination from time to time.

Keywords: pollination, bio-pollinators, fertilizers, pesticides, adaptation

Introduction
Recent pollination biological studies show that the trends of different pollinators visiting flowering plants are proximally fixed, but the visiting of pollinators is also diversified due to the use of various types of insecticides and pesticides in crop fields. In many landscapes with a mix of agricultural and natural habitats, crop pollination by bees and other animals is a potentially valuable ecosystem service [1, 2]. It has been discovered that animal pollination benefits 87 of 115 types of globally important crops. It has been discovered that the majority of tiny insect pollinators are dying as a result of the massive addition of poisonous chemicals such as insecticides and pesticides [3].

Over the past decade, scientists have been reporting steady and mysterious declines in the populations of so called pollinator insects. These include the honeybees, wasps, flies, beetles, butterflies and moths.

Bumblebees (*Bombus* sp.) were brought from Europe due to a lack of pollinators for red clover (*Trifolium pretence*) seed production in New Zealand at the same time that the fig pollination issue was resolved in California [4, 5, 6]. Their establishment was successful, although New Zealand has still not solved its on-going problems with regard to the pollination of *Actinidia deliciosa* [7].

Recently, a solution to oil palm pollinator shortages has been found in Malaysia, where labour costs for manual pollination are rising sharply. It was found that pollination of this important crop has a relationship between the pollinating *Elaeidoubius* sp. and the male and female inflorescences of palm trees [8]. After careful screening and quarantine, *Eleidobias* sp. was released in palm oil plantations in Malaysia, where it quickly established and spread [9]. The result is sustainable and adequate plant pollination, with high yields that surpass those previously achieved with hand pollination, saving millions of US dollars annually [10].

In this study, we aim to find out some novel pollinators that visit flowering plants (crops) for pollination. From the point of view of pollination biology, three families were selected, such as Fabaceae, Malvaceae and Apiaceae.

Materials and Methods
Plants of the families like Fabaceae, Malvaceae, and Apiaceae were selected for this study. The study was done in Birbhum district of West bengal, India for two consecutive flowering seasons (2019-2020 & 2020-2021). Various floral phenology and floral biology were studied according to the proposed method [11, 12, and 13]. Insect flower visitor foraging times, feeding types, and pollination syndromes were carefully observed and recorded using standard methods [14].

Result and Discussion
Bee poisoning by pesticides is a major problem affecting bee efficiency not only in honey production, but also in crop pollination. This problem is not unique to the United States [15], but occurs in all other countries with highly developed agriculture. The problem is complex, has many implications, and frequency is intertwined with state. Most of the problems are related to pesticides used on crops such as cotton, fruits, vegetables, grains and legumes. Damage is also caused by the treatment of forests, rangelands and even suburban areas for human and animal management.

Wild bees are also being harmed by pesticides [16]. Poisoning can be caused not only by contaminated food, but also by wood, leaves, soil or other materials that bees use to build their nests. The toxicity of a particular insecticide to honeybees and wild honeybees is not always the same, and even to wild honeybees, some substances are more toxic to one species than another.

The problem of bee poisoning is a long-standing problem. At the beginning of this century, things got unusually serious in relation to the use of arsenic sprays on fruit. This has led several states to pass laws banning the spraying of flowering trees. Pesticides applied to plants can reach the nectar either directly or indirectly by traveling through the plant system from the treated part [17].

For many beekeepers, the severity continued to rise, with a catastrophe in the late 1960s. At this time, legislation in response to public concern severely restricted the use of DDT and other chlorinated hydrocarbons, in most cases

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Full Length Research Article

Floral Biology and Pollination of *Abelmoschus esculentus* (L.) Moench.

Hemanta Saha*[1]

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ABSTRACT

Present investigation deals with the flowering phenology, pollen production, flower visitor interaction, pollen dispersal and pollination of a highly economic important crop plant *Abelmoschus esculentus* (L.) Moench. belonging to the family Malvaceae. Flowering occurred in between April - October, which are yellowish, actinomorphic flowers open in morning (05:00am to 06:30am) and anther dehiscence takes place transversely after flower opening. In average a single anther produces 1250 pollen grains. After flower opening large number of insects come in contact with flower like member of Hymenoptera (Ant, *Apis cerana indica*, *Pithitis* sp.), Lepidoptera (*Borbo* sp.) and member of Diptera. The style is surrounded by a staminal column which bears large number of anthers. The pollen grains come in contact with the stigmas around the throat of the staminal column. It has been found experimentally that there is significant difference in fruit set under open-pollinated (75%) and bagging (45%). Bagging result indicates the self-pollination and open-pollinated fruit set shows insects are helpful for cross-pollination and fertilization because the flowers are very attractive to the flower visitors.

Key words: Flower- visitors, Foraging materials, Pollination, Fruit set, Style, Staminal column, Stigma

A flower consists of four parts (i) calyx-the outer whorl protects the flower bud; (ii) corolla- the second whorl which protects the bud as well as attract different flower visitors by their attractive colour; (iii) androecium- the third whorl which consists of stamens, showing the grow male reproductive unit i.e., pollen grain within the anther and (iv) gynoecium- the innermost whorl and consists of pistil, the female reproductive organ of plants. The third and fourth whorl i.e., androecium and gynoecium directly take part in the reproduction. Structural features of flowers are of great importance for knowledge of pollination and reproduction systems. In some plants, the flower structure favors self-pollination, while in others it favors cross-pollination. Darwin's first book on flower biology states that the various devices insects use to pollinate orchids result in cross-pollination.

Wide variety of orchid flower morphologies arose as a result of natural selection by various mechanisms that facilitated pollination and fertilization from one flower to another [1]. In a natural environment, flowering plants reproduce due to both biotic and abiotic influences [2]. Pollinators influence the production of various crops such as fruits and vegetables. Increasing crop yields is important for health, nutrition, food security and increasing farmer incomes. Classifying attractants into primary attractants such as pollen, nectar and hatchery and secondary attractants such as odor, color and temperature, knowledge of flower morphology is essential for assessing pollination and flower-visitor interactions [3].

The facts of plant-pollinator interactions and their role in pollination and maintenance of plant diversity are the subject of co-evolutionary relationships between flowers and pollinators under different conditions during reproductive periods when floral traits are different, emphasized by complexity. Most plants are pollinated by insects, with bees being the predominant pollinator [4]. Butterflies are also important pollinators [5-6]. Pollination of crops by various insects such as bees, butterflies, flies and other animals is a potentially valuable ecosystem service, often in mixed farming and fruit production. Most of our crops are poorly adapted to biotic and abiotic stresses such as disease, pests, drought, salinity and the constant introduction of new adaptive genes, so maintaining crop diversity and to improve further, you need cultivated crops.

Some crop plants exhibit the entomophilous pollen dispersal mechanism in atmosphere [7]. Plant-pollinator interactions in relation to floral symmetry and nectar guides functionally significant [8]. Increased pollinators population in presence of nectar and pollen abundance [9]. Insect mediated airborne pollen dispersal of *Alangium salvifolium* (L.F.) [10]. In this study, an attempt was made to investigate flower phenology, flower visitor interactions, pollen dispersal, and flower visitor contribution to successful pollination of *Abelmoschus esculentus* (L.) Moench. Known as lady's finger

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Influence of Fertilizer on Growth, Yield and Chlorophyll Contents of Ground Nuts

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Abstract:

Groundnut (*Macrotylomageocarpum*) is cultivated in worldwide of which mostly South Africa, US and India is huge amount of cultivated. Groundnut is a type of legume crops and it is mainly grown in tropical and subtropical area. In addition Groundnut is huge amount of cultivated in India because, it has rich oil and protein content and nutrition value. Several minerals and fertilizers are used to increase crop production to increase soil fertility and improve cultivation. Here we use organic (cow manure) and inorganic (NPK 19) fertilizers. In addition some parameters are used such number of leafs, plant height, chlorophyll contents and nitrate reductase. Here are the chlorophyll contents of leaves and NPK 19 fertilizer interaction has been observed. Using NPK 19 fertilizer and cow manure has increased the height of the plant and increased the productivity of the plant.

Key-words: Inorganic, Organic, Fertilizer, Microbiology, Biology.

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Introduction:

Groundnut is most cultivated legume crop in world and it is a type of edible seeds. Groundnut also known as pindar, monkey nut and peanut. It is known by different names in different places of which peanut name is one of them.Geocarpa groundnut (*Macrotylomageocarpum*) is one of the legume crops in groundnut. The groundnut crop falls under the taxonomically Fabaceae family and Fabales order. The groundnut legume crop is cultivated in different parts of the world. According to 2016 report about 45 million tons of groundnut is produced all over the world. The groundnut (*Macrotylomageocarpum*) crop is widely grown in US, South Africa and India. It is mainly cultivated in tropical and subtropical regions of India. This crop is very well growing in sandy loam nature soil. It grows well at 26-34°C in hot season and 20-24°C in cold season. Groundnut is in high demand all over the world because of its rich protein and oil content and because of its nutrition value; it is used as human food. Since, groundnut can retain nitrogen in the air; it uses less N_2 containing fertilizers, which improves soil fertility. Groundnut production is expected to enhance as a result of maximum nutrient absorption. The amount of crop production is less if the area of agricultural land is less and there is not proper supply of nutrient. In addition, fertilizers can also be used when applying nutrients. Deficiency of nutrients is a major cause of crop loss. There are some essential nutrient elements that play an important role in crop growth, production and crop quality and which cause less damage to the environment. There is a positive effect between crop productivity and use of fertilizer. Using fertilizer it has been seen that the amount of crop has increased by about 60%. The fertilizer affects on the structural, chemical and physical character of the soil. As the use of chemical fertilizers increases the production of the crop, the use of more

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SUNSCREENS IN INDIAN SCENARIO: AN OVERVIEW TOWARDS SKIN PHOTOPROTECTION

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ABSTRACT

Objectives: Sunscreens are at the heart of comprehensive skin care routine. This study aims to improve the knowledge and understanding of undesired effects of sun exposure such as sunburn, photoaging, phototoxic reactions, and even skin cancer, as well as Indian attitudes and practices towards sun protection. **Method:** This study focuses on the scientific basis of sunscreen use, including types and classifications, formulation, regulations, and adverse effects. In addition, particular emphasis was given to the Indian perspective. **Findings:** The skin-damaging effects of ultraviolet radiation are protected by sunscreens through blocking, reflecting, scattering or absorbing sunlight. Commercially available sunscreens come in various formulations such as gel, cream, spray, or other topical products. It has been found that the UV-filters used in sunscreens may sometimes cause some undesired side effects. In India, unfortunately, most people are not aware of sunscreens and there is a lack of basic knowledge about their proper use. However, in recent years, the scenario has changed a lot. **Conclusion:** Despite their lack of knowledge regarding sun protection, overall sun protection is poorly practiced by the Indians. A continuous effort in public education is required concerning its beneficial effects. This review article provides an in depth summary of modern sun protection which, provides better public awareness, particularly among the Indians about a protective spectrum of sunscreens.

Keywords: Sunscreens, UV radiation, Sun Protection Factor, UV filter, adverse effects, Indian Perspective

1. INTRODUCTION

The skin complex of the Indian population is often described as ‘goddess’ or ‘sun-kissed’ type. The Food and Drug Administration (FDA) and American Academy of Dermatology have classified the skin type on a scale from I to VI. People with I and II skin types have fair skin and tend to burn fast and more severely. Indian skin falls under the III-VI skin type[1]. Compared to people from other parts of the world, Indian skin is much thicker. It has more tendencies to tanning but is less prone to sunburn in comparison with Caucasian skin. High pollution levels particularly in urban areas, UV exposure, humidity, excessive heat, and cold are the major environmental factors that affect Indian skin. In tropical countries, especially in India, where maximum regions experience hot to very hot and humid weather and most human activities are sunlight oriented, exposure to UVA and UVB (sunlight) rays is a regular phenomenon. Repeated exposure to UV radiation is responsible for both short and long-term changes in the structure of the skin. Repeated exposure leads to erythema of the skin, commonly known as sunburn[2]. The erythema is mimicked by the activation of melanocytes, which increase melanin production, darkening the skin's appearance, Chronic exposure causes extrinsic skin ageing and can lead to skin cancer[3]. Therefore, it is almost essential to take appropriate measures to protect the skin from UV radiation, especially during the daytime when sun exposure is highest. Photoprotection comprises the protection of the

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العلامة المقريزي وكتابه الخطط[1]

- الشيخ ضياء الدين الإصلاحي[2]

ترجمة من الأردوية: د. محمد معتصم الأعظمي[3]

إنّ العلامة المقريزي مؤرخ بارز وشهير من القرنين الثامن والتاسع الهجريين، ومن أشهر مؤلفاته كتاب "الخطط" وهو كتاب قيّم ومعروف جدًا، سنقدّم أولًا أخباره التي ظفرنا بها بعد البحث والتحقيق ثم سنقدّم تعريفًا شاملًا لكتابه الشهير هذا.

اسمه ونسبه: هو أبو العباس أحمد الملقب بـ"تقي الدين". أحمد بن علي بن عبد القادر بن محمد بن إبراهيم بن محمد بن تميم بن عبد الصمد بن أبي الحسن بن عبد الصمد بن تميم.[4] يكتب المقريزي عن نسبته "المقريزي" في الخطط فيقول: "وأما واضع هذا الكتاب ومرتبه، فاسمه أحمد بن علي بن عبد القادربن محمد، ويعرف بالمقريزي".[5]

فقول السخاوي والشوكاني: "ويعرف بابن المقريزي" لا يبدو صحيحًا.

والمقريزي نسبة لحارة معروفة في بعلبك (الشام) وهي المقارزة، فيكتب العلامة السخاوي: "وهي نسبة لحارة في بعلبك تعرف بحارة المقارزة".[6]

ولكن أئمة اللغة والجغرافيا لم يكتبوا عنها شيئًا، وكتب هذا صانع "تاج العروس" فقط ناقلًا عن العلامة السخاوي.[7] ويظهر من قول خير الدين الزركلي أنّ هذه الحارة

[1] اسمه الكامل "المواعظ والاعتبار بذكر الخطط والآثار" وهو معروف بالخطط المقريزية

[2] علم من أعلام الهند، وعالم كبير للدراسات القرآنية والحديثية

[3] نائب مدير تحرير المجلة ومدرس، قسم اللغة العربية وآدابها، كلية سيوري فيديا ساغر، بنغال الغربية، الهند

[4] الضوء اللامع، 21/2، والبدر الطالع، 79/1

[5] الخطط، 5/1

[6] الضوء اللامع، 21/2

[7] يراجع إلى تاج العروس

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تقرير:

مسابقة كتابة التلخيص لمؤلفات الإمام عبد الحميد الفراهي

إعداد: د. محمد معتصم الأعظمي[1]

كان من المزمّع عقد مسابقة "كتابة التلخيص لمؤلفات الإمام عبد الحميد الفراهي" في الـ25 و26 من شهر يناير 2022م ولكن المدرسة كانت مغلقة بسبب جائحة كورونا فالشتاء وحينما استأنفت المدرسة فعالياتها حان موعد الاختبار السنوي مما أدّى إلى تأجيل هذه المسابقة ولم يمكن عقدها كالمعتاد فتقرّر أنْ يقدّم الطلاب مقالاتهم بحلول الـ20 من شهر فبراير فعلى الرغم من شغلهم بالاختبار قدّم طلّاب "الفضيلة" مقالاتهم.

وأقيم يوم السبت الـ19 من شهر مارس 2022م حفلة في مسجد مدرسة الإصلاح بعد صلاة الظهر وزّعتْ فيها الجوائز على الطلاب المشاركين في هذه المسابقة.

وتمّ توزيعها بحضور مدير المدرسة الدكتور فخر الإسلام الإصلاحي وعميدها الشيخ سيف الإسلام الإصلاحي القاسمي وأعضاء هيأة إدارة المدرسة وتعليمها الدكتور علاء الدين خان والدكتور محي الدين آزاد والدكتور خالد الأعظمي والأستاذ عبيد الله القاسمي. ونال الطلاب ما نالوه من الجوائز الدرع والشهادة والكتب والنقود. وقد نظّم هذه المسابقة مركز السيد أبو الأعلى المودودي للأبحاث بلكناؤ الذي يديره سكندر علي الإصلاحي.

شارك في هذه المسابقة 19 طالبًا للمدرسة وفازوا بدرجات ونالوا. والتفصيل كما يلي:

[1] نائب مدير تحرير المجلة ورئيس قسم اللغة العربية وآدابها، كلية سيوري فيديا ساغر، بنغال الغربية، الهند

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PAPER

Structural, optical, and antibacterial properties of Li-doped ZnO nanoparticles synthesized in water: evidence of incorporation of interstitial Li

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Keywords: defects, interstitial position, li doping, synthesis in water, ZnO nanoparticles

Supplementary material for this article is available online

Abstract

The mode of incorporation of lithium (Li) (as substitution or interstitial position) in zinc oxide (ZnO) has its own importance as far as the potential applications of Li-doped ZnO nanoparticles (NPs) are concerned. Fabrication of p-type ZnO-based semiconductors as well as defect engineering-based applications demand substitution of Zn^{2+} by Li^{+}. However, doping of ZnO by Li with interstitial positions can play an important role in controlling different properties of it. In the present study, we report the successful doping of Li in ZnO NPs up to a Li concentration of 10 mol% employing a simple wet chemical precipitation method in water. Up to a Li concentration of 8 mol%, doping by substitution of Li to the Zn sites has been observed. However, for 10 mol% of Li concentration, doping by incorporation of interstitial sites in addition to the substitution has been confirmed through complementary characterization techniques. The effects of interstitial Li in ZnO on structural, optical, and antimicrobial properties have been studied in detail systematically. For all the cases (structural, optical, and antimicrobial), the properties of Li-doped ZnO NPs have been changed reversibly in the ZnO NPs after the incorporation of interstitial sites by Li as compared to the substitution of Li. For example, the microstrain, band gap, and antimicrobial activity have been found to increase with the increase in Li concentration up to 8 mol%. However, the microstrain, band gap, and antimicrobial activity are found the decrease for 10 mol% of Li as compared to 8 mol% of Li. This study indicated that the different properties of Li-doped ZnO NPs can be controlled suitably as per the requirements for the practical applications of ZnO-based materials.

1. Introduction

Zinc oxide (ZnO) has been extensively studied as a direct and wide band gap semiconductor. ZnO nanostructures are popularly engaged in several fields owing to their peculiar chemical and physical properties [1]. ZnO nanostructures have been first functionalized in the rubber industry because they can supply waterproofing of the related composite and other functions [2]. Strong ultraviolet (UV) absorption characteristics of ZnO nanostructures make it a popular constituent in personal care products, like Sunscreen and cosmetics [3]. ZnO nanostructures have a broad variety of applications in antimicrobial defense, photocatalysis, and water purification [4]. Further, ZnO nanostructures have been often used as a highly competent *n*-type buffer sheet of organic optoelectronic devices [5] due to their proper active layer

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Explanation of major determinants of poverty using multivariate statistical approach and spatial technology: a case study on Birbhum district, West Bengal, India

Ranajit Ghosh · Niladri Das · Prolay Mondal

Accepted: 14 October 2022

Abstract Poverty is not only the focal issue that has drawn worldwide attention but is also an essential issue in people's livelihoods. This research examines the primary factors of poverty in the Birbhum district. Multivariate statistical techniques have been used to identify the primary determinants. Ten parameters have been identified as significant drivers of poverty, six of which are physical, viz. slope, elevation, drainage density, pond frequency, soil texture, and rainfall. The remaining four sociocultural and economic parameters are literacy, major market center, population growth, and road density. A linear relationship has been established between the explanatory and response variables where the *R*-square or coefficient of determination value is 0.741, and this relationship explains more than 74% of the variables. The *P*-value of multi-linear regression is 0.000, which validates the model and permits the data for factor analysis to extract the major determinants. Factor analysis indicates that five essential factors have been found based on their eigenvalue viz., agro-climatic factor, infrastructural and educational factors, hydrological factor, demographic factor, and pedological factors. All the p-values of the correlation matrix are < 0.05, meaning all the relationships are valid and significant. This research also demonstrates the spatial analysis of data using GIS technology. The western part of the study area has been affected by the high influence of all factors due to the presence of plateau fringe and associated low productivity. The outcomes of the research are scientifically significant and this study helps the planners, higher authorities, and social workers to eradicate poverty from this region through formulating better policies and management.

Keywords Povertydeterminants · Multilinear regression · Poverty incidence · Factor analysis

Introduction

The economic growth of any country or region is heavily influenced by their income and spending habits as well as their savings, loans, and investment patterns.A country with a developed economy is characterised by high levels of income and consumption (Headey, 2008). In contrast, a country's poor economic position is characterized by low income and expenditure levels. People living in underdeveloped or developing countries are interested in transmitting goods and services. However, their demands are

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Neurotic science in plants as stated in Ayur-Veda

Dr. Dinesh Kumar Das*

Abstract

The definition of neuroscience is recognized only animals as having nervous systems. However, for the past couple of decades, botanists have been carefully scrutinizing distant signaling systems in plants, and some scholars have stated that plants do not have nervous system. Thus, an academic conflict has emerged between those who defend and those who deny the existence of a nervous system in plants. This article analyses the cardinal process of the nervous system and the phylogenic process acts upon the plants.

Keywords :- Plants, animals, 'Vāta', 'Pitta' 'ṣaṣh', nervous system, Ayur-Veda, Ida, Pingala.

Introduction :

Acharya J. C. Bose was the first to study the action of microwaves in plant tissues and the changes in the plant cell membrane potential. Through this study, he proved that plants are sensitive to pain and affection. Afterwards a group of scientists convey the electrical transmission as well as the nervous system of the plant[1]. On the other hand some scholars are saying that the plants are under classification of phylogenic organism. Whatever may be the nature, either neurotic or phylogenic, plants have a genealogical transmission to their present existence. The functions

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1. India today web desk, New Delhi, May 10 2016. Updated - November 23, 2018 10:43.

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COMPLETENESS IN MULTI METRIC SPACES

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Abstract: In the present paper a notion of convergence in multi metric space is presented. Complete multi metric space is introduced and some properties are studied. Cantor's intersection theorem and Banach's fixed point theorem are established in multi set settings.

Keywords and Phrases: Multi metric, iterative sequence, Cantor's intersection theorem, Banach's fixed point theorem.

2020 Mathematics Subject Classification: 54E35, 54E50.

1. Introduction

Multiset (bag) is a well established notion both in mathematics and in computer science ([8], [9], [22]). In mathematics, a multiset is considered to be the generalization of a set. In classical set theory, a set is a well-defined collection of distinct objects. If repeated occurrences of any object is allowed in a set, then a mathematical structure, that is known as multiset (mset, for short), is obtained ([21], [23], [24]). In various counting arguments it is convenient to distinguish between a set like $\{a, b, c\}$ and a collection like $\{a, a, a, b, c, c\}$. The latter, if viewed as a set, will be identical to the former. However, it has some of its elements purposely listed several times. We formalize it by defining a multiset as a collection of elements, each considered with certain multiplicity. For the sake of convenience a multiset is written as $\{k_1/x_1, k_2/x_2, ..., k_n/x_n\}$ in which the element x_i occurs k_i times. We observe that each multiplicity k_i is a positive integer.

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UPAKATHĀVIŚEṢĀṀKAḤ

उपकथाविशेषांकः

धन्योऽयं भारतो देशः धन्येयं सुरभारती।
उपासकाः वयं यत्र धन्या अहो परम्परा।।

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Representation of Women in Pañcatantra: A socio-cultural study

Debarati Chandra

This paper will re-examine the Pañcatantra stories to review the portrayal of women in them. Women have always been worshipped, adored and revered in ancient and Modern Sanskrit literature. In Pañcatantra, references to women are very few. In some of the stories [For this paper, I have referred to Arthur William Ryder's The Pañcatantra(1925), University of Chicago Press] women are portrayed as virtuous, wise counsellors and better halves to their male partners in the true sense whereas in some stories they are portrayed with negative characteristics. The Pañcatantra stories were composed or compiled to educate the three ignorant sons of king Amaraśakti. These fables are very popular with children also. So, representation of gender in these stories are a very crucial aspect to ponder over because these stories have a permanent impression on the young minds.

Keywords: *fable, women, representation, gender.*

Originally written in Sanskrit, the prelude or preamble of the *Pañcatantra* identifies an octogenarian *Brāhmin* named Viṣṇuśarma as its author. Some South Indian recensions and some Southeast Asian versions of *Pañcatantra* attribute the text to Vasubhaga.[1] The *Pañcatantra* belongs to the rich tradition of oral literature in India. It is a collection of tales populated mainly with animal characters acting as heroes and villains and executed with a moralistic content and a clearly didactic tone. The preamble

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Research Review

Role of Pollinators in Plant Reproduction and Food Security: A Concise Review

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Abstract

Pollination can increase the yield, quality and stability of fruit and seed crops. Animal pollination plays an important role in sexual reproduction and the successful pollination of many crops. Inadequate pollination not only reduces yield, but can also affect yield and produce a high percentage of poor-quality fruit. Most of our crops are poorly adapted to biotic and abiotic stresses such as disease, pests, drought, salinity and the constant introduction of new adaptive genes lead to preserve crop diversity and enhance pollination. Pesticides kill pollinators directly, and herbicides kill pollinators indirectly by reducing what they eat. Habitat destruction has reduced pollination in agricultural and natural areas. Pollinator numbers are believed to be declining worldwide, resulting in reduced yields in some crops, ultimately impact on food production and food security.

Key words: Pollination, Stress, Pesticide, Yield, Food Security

Pollination is the transfer of pollen from a male part of a plant to a female part of a plant, later enabling fertilization and the production of seeds, most often by an animal or by wind. Pollinating agents are animals such as insects, birds, and bats; water; wind; and even plants themselves, when self-pollination occurs within a closed flower. Pollination often occurs within a species. When pollination occurs naturally as well as by plant breeders in between species it can produce hybrid offspring [1]. In angiosperms, after the pollen grain has landed on the stigma, it germinates and develops a pollen tube which grows down the style until it reaches an ovary. Sperm cells from the pollen grain then move along the pollen tube, enter an ovum cell through the micropyle and fertilize it, resulting in the production of a seed.

A successful angiosperm pollen grain (gametophyte) containing the male gametes is transported to the stigma, where it germinates and its pollen tube grows down the style to the ovary. Its two gametes travel down the tube to where the gametophyte(s) containing the female gametes are held within the carpel. One nucleus fuses with the polar bodies to produce the endosperm tissues (3n), and the other with the egg cell (female gamete) to produce the embryo (2n). Thus, the phenomenon is called double fertilization [2-3]. In gymnosperms, the ovule is not contained in a carpel, but exposed on the surface of a dedicated support organ, such as the scale of a cone, so that the penetration of carpel tissue is not needed here. Details of the process vary according to the division of gymnosperms in question. Two main modes of fertilization are found in gymnosperms. Cycads and Ginkgo have motile sperm that swim directly to the egg inside the ovule, whereas conifers and Gnetophyres have sperm, that are unable to swim but are conveyed to the egg along a pollen tube [4].

The study of pollination brings together many disciplines, such as botany, horticulture, entomology and ecology. The pollination process as an interaction between flower and pollen vector was first addressed in the 18th century by Christian Konrad Sprengel. It is important in horticulture and agriculture, because fruiting is dependent on fertilization: the result of pollination. The study of pollination by insects is known as anthecology [5]. Pollination can increase the yield, quality and stability of fruit and seed crops. Animal pollination has important role in sexual reproduction and successful pollination of many crops. Another value of pollination lies in its effect on quality and efficiency of crop production. Inadequate pollination can result not only in reduced yields but also affect the yield and produced high percentage of inferior fruits [6].

Process

Pollen germination has three stages; hydration, activation and pollen tube emergence. The pollen grain is severely dehydrated so that its mass is reduced enabling it to be more easily transported from flower to flower. Germination only takes place after rehydration, ensuring that premature germination does not take place in the anther. Hydration allows

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Role of Plants for Evaluation of Air Pollution Tolerance Index on the Basis of Some Biochemical Parameters: A Concise Review

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ABSTRACT

Several common plants such as, *Mangifera indica, Pinus roxburghii, Thuja occidentalis, Tamarindus indica, Cassia fistula, Dalbergia sissoo, Quercus* sp., *Bauhinia recemosa* etc. are available to absorb various pollutant gases. Plant leaves are the ideal indicator to measure the degree of air pollution and most plant have exhibited various physiological changes before showing any visible symptom in the leaves. Air pollution tolerance index (APTI) is a simple and efficient method for identifying plant species that can tolerate air pollution. It only requires four different types of leaf biochemical parameters, including the pH of plant leaf extract, the relative water content of the leaf, ascorbic acid, and the total chlorophyll content of the leaf. The amount of plant susceptibility to air pollution was assessed using the APTI score. Higher APTI-valued plants are extremely beneficial as a bio-monitoring tool for improving the atmosphere. For plantation programmes in newly constructed urbanised areas and avenues to produce pollution-free green environments, plant species with higher APTI values can be prioritised.

Key words: Air pollution, APTI, Biochemical parameters, Green environment, Leaf extract

Introduction

21st century is the era of modern technology, which provides cozy lifestyle of human civilization. But environmental pollution is the major drawback behind the enormous success of scientific achievements and by product of industrialization and urbanization. Thus worldwide living organisms suffered severely as the effect of various types of pollution (Aasawari and Umesh, 2020).

Plants have an important role to reducing as well as monitoring air pollution through the recycling of gases specially CO_2 and O_2 by photosynthesis and also providing vast leaf canopy for accumulation, absorption and impingement of air pollutants to minimize the ambient environmental air pollution level (Suvarna *et al.*, 2008). They are the best dust collectors. Plant leaves are the ideal indicator to measure the degree of air pollution and most plant have exhibited various physiological changes before showing any visible symptom in the leaves. Acclimatization of plants to air pollutants might change their morphological structure such as thicker epidermal cells and longer trichomes (Steubing *et al.*, 1989; Dohmen *et al.*, 1990; Rangkuti, 2003). According to various reports many plant species such as *Mangifera indica* (Mango), *Pinus roxburghii* (Chir), *Thuja occidentalis, Tamarindus indica* (Imli), *Cassia fistula* (Amaltas), *Dalbergia sissoo* (Sishu), *Quercus* sp. (Oak), *Bauhinia recemosa* (Kanchan) etc. act as air pollution

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Biomarkers for the Assessment of Pesticide Toxicity in Fish

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Abstract: Pesticide (a type of biocide) is any substance or a mixture of several compounds produced to control or to kill various unwanted species of animals and plants. Even in modern days pesticide is the ultimate and easy choice for preventing a vast range of agricultural pests. But the indiscriminate use of these synthetic chemicals in agricultural field has created serious problems to the target as well as to the non-target organisms living in agricultural field as well in the nearby aquatic bodies like river, pond, stream etc. Fish, the important source of protein, is highly affected by the agricultural usage of different classes of pesticides. On pesticide exposure fish respond biochemically by altering the level of DNA, RNA, liver and muscle glycogen. Several enzymes like acetylcholine esterase, alanine aminotransferase, aspartate aminotransferase activity also changed by different classes of pesticides. Haematological parameters like RBC count, WBC count, mean cell volume, haemoglobin level, blood glucose level act as important biomarkers during the assessment of toxicity caused by pesticide. Several studies reported that major organs like liver, kidney, spleen, brain, intestine of fish are highly affected by pesticides. Hypertrophy, necrosis, pyknosis of hepatocytes, fusion of primary lamellae of gills and atrophy of epithelial cells of intestine are the most common histopathological symptoms caused by pesticides. The immune system of fish respond to pesticide entry into the biological system by altering the expression level of several parameters like immunoglobulin, complement protein, lysozyme activity and others. Besides these physiological parameters there are various behavioural parameters which are the primary responses of fish on pesticide encounter. So, these responses against pesticides can act as vital biomarkers for the assessment of toxicity of a pesticide in biological system. In this mini-review, the biological responses in terms of biomarkers of effects have been discussed due to the exposure to chemical pesticides in fish.

Keywords: Pesticide, Biochemical, Immunological, Histopathological, Behavioural biomarker

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Introduction

A huge number of synthetic chemical pesticides having diverged chemical structures and properties are frequently applied in agricultural fields to control the pest population. These pesticides are used to kill a target organism, particularly the pest, but in most cases directly or indirectly these also affect several non-target organisms (Bhatnagar *et al*., 1992; Tudi *et al*., 2021). A number of studies reported that only a small proportion of the applied chemical

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استعراض كتاب:

الهند الإسلامية تاريخها وحضارتها

(عصر السيادة العربية)

- د. محمد معتصم الأعظمي[1]

عنوان الكتاب: الهند الإسلامية تاريخها وحضارتها (عصر السيادة العربية)

تأليف: الدكتور محمد حسن الباشا

الناشر: مرايا للطباعة والنشر والتوزيع، دبي- الإمارات العربية المتحدة

سنة الطباعة: 2023م

الطبعة: الأولى

عدد الصفحات: 344

يسعدني أنْ أعرض للقرّاء كتابًا جمعه وألّفه الدكتور محمد حسن الباشا الذي ينحدر من قرية الديدامون لمركز فاقوس، محافظة الشرقية (مصر). ولد في 1984م وأتمّ الدكتوراه من قسم التاريخ الإسلامي بكلية الآداب (جامعة بنها) وهو أستاذ التاريخ الإسلامي المشارك ونائب رئيس الجامعة الإسلامية بمنيسوتا فرع الهند. له مؤلفات عديدة منها "من كنوز الحضارة الإسلامية في شبه القارة الهندية، "تحفة الزمان في تاريخ بلوشستان"، "الممالك والإمارات العربية في شبه القارة الهندية، "إقليم المنصورة بالسند في عصر السيادة العربية"، "الهند الإسلامية تاريخها وحضارتها" و"بنو سامة بين عمان وملتان" كما قام بترجمة العديد منها. وله أبحاث ومقالات نشرت في المجلات

[1] نائب مدير تحرير المجلة ورئيس قسم اللغة العربية وآدابها، سيوري فيديا ساغر، بنغال الغربية، الهند

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إلى رحمة الله:

الشيخ صلاح الدين الإصلاحي

(1943-2023م)

كل نفس ذائقة الموت، ولكن لحظات الوداع والفراق تسجّل الحزن في القلب وتخلّد الذاكرة وتخنق الدموع من العيون وخصوصًا حينما نودّع واحدًا من جيل المربين والأساتذة الأفاضل ألا وهو أستاذنا جميعًا المربي المرحوم الشيخ صلاح الدين الإصلاحي الذي فارق الدنيا بعد مسيرة عطاء عريضة، ومشوار حياة في السلك التعليمي والعمل التربوي والاجتماعي، تاركًا سيرة عطرة، وذكرى طيّبة وروحًا نقية، وعبق أريج نرجسة في ربى الروحة وشذا شجرة برتقال يافية وميراثًا من القيم والمثل النبيلة فجعنا بهذا الحدث المؤلم صباح يوم 19/يونيو 2023م وقضى الرحيل أكثر من خمسين عامًا في سلك التدريس في مدرسة الإصلاح وهو كان أستاذ التفسير والأدب العربي والبلاغة فيها.

تُعدّ مدرسة الإصلاح بسرائمير(أعظم كره، الهند) إحدى دور العلم الكبيرة، وأنجبت علماء ودعاة كبارًا أدّوا خدمات جليلة ولهم أثر بالغ في تنوير أذهان الجيل الناشئ في الهند وخارجها. ولم تنحصر أعمال هؤلاء العظام في مجال التعليم ومناهج الدراسة، بل وقدّموا في مجال البحث والترجمة والتحقيق والتأليف ما لا ينسى ولا يستهان به، وبذلوا كلّ غال ورخيص في سبيل ترويج اللغة العربية وآدابها، وكانت لهم صلات قوية بهذه اللغة حتى قدّموا إنتاجاتهم باللغة العربية على وجه الخصوص. ومن أبرز خريجيها الشيخ الجليل أمين أحسن الإصلاحي الذي كتب تفسير القرآن بالأردوية باسم "تدبر قرآن" في تسعة مجلدات ضخمة على منوال شيخه الإمام عبد الحميد الفراهي في أسلوب ممتع جذّاب، والشيخ نجم الدين الإصلاحي الذي ساهم في تطوير اللغة الفارسية والأردوية،

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Al nanoparticles decorated Er:TiO_2 thin film based plasmonic photodetector

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Abstract

Aluminum (Al) nanoparticles (NPs) patterned Erbium-doped Titanium dioxide (Er:TiO_2) thin films (TFs) were synthesized ... deposition (GLAD) technique inside the thermal evaporation system. Effe...

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Unveiling Susruta's Legacy: Ancient Anatomy and the Concept of Sira

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Abstract: Ayurveda provides in-depth knowledge of the human structure and treatments for disorders. The Charaka Samhita, Susruta Samhita, and Vagvat Samhita are three important Ayurvedic writings that offer priceless insight into this subject. The Susruta Samhita serves as a foundational text on human anatomy and contains the oldest documented surgical education. Susruta sheds insight on the differences between sira (nerves), dhamani (blood vessels), and srotas (channels), as well as their functions and interactions. In modern medical study, the elucidation of the classical anatomy related to these aspects is very significant. Neurological advances can be greatly aided by an understanding of the complex interactions among the sira, dhamani, and srotas. The present review aims to highlight this classical anatomy and its relevance to the present-day understanding of the human nervous system. By exploring the insights provided by Ayurvedic texts, we strive to bridge the gap between ancient wisdom and modern medical research. This endeavor has the potential to enhance our comprehension of neurology and potentially lead to new approaches for the prevention and treatment of neurological disorders.

Keywords: Ayurveda, Sira, Dhamani, Srotas, Medical Research

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Introduction

The field of surgery necessitates a thorough understanding of the human body's complicated processes. Susruta, a notable ancient Indian physician, contributed much in respect of anatomical knowledge through his revolutionary work on human corpse dissection and its relationship to circulatory networks. Prior to Susruta, animal dissections were the primary source of anatomical information. Susruta's detailed observations and documentation of the dissection procedure on human cadavers, on the other hand, constituted an important milestone in the evolution of anatomy in India. His fundamental work in this discipline earned him the moniker

Original Article

Demand for Maternal Health Inputs in Eastern States of India

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Sage

Ramananda Roy[1], Bhaskar Bhattacharyya[2] and Biswajit Mandal[2]

Abstract

Using NFHS-4 data, this study explores the determinants of maternal health care programmes for eastern states of India, which include prenatal care and hospital delivery. To reduce unobserved heterogeneity in the analysis, we employed the Full Information Likelihood Method, also known as the Joint Estimation Technique, in conjunction with individual probit models. Like other studies, we found place of residence, wealth, caste, religion and level of education as significant contributor for demand for both services. But, unlike earlier studies, we found that women's age increases the use of prenatal care and hospital delivery, and the child's birth order influences getting prenatal care. To increase the utilisation of maternal health care services, we recommend investing in health infrastructure, increasing the Janani Suraksha Yojana (JSY) subsidy amount and coverage of the Janani Shishu Suraksha Karyakram (JSSK) scheme, and promoting awareness about various government programmes among women through the Accredited Social Health Activists (ASHAs).

JEL Codes: I140, I150, I180, O150

Keywords

Maternal health, women's health, newborn health

I. Introduction

The quality of life of the future generation is associated with the well-being of both the mother and the newborn. For this reason, the Millennial Development Goals by the United Nations focused on increasing hospital delivery and reducing catastrophic events, which recently led to some improvement in the maternal and newborn mortality figure. However, in developing countries, apart from many supply-side constraints, many healthcare services meant for women and children are still underutilised, despite the critical need for those services. As a result, these countries still experience considerable cases of maternal complications and fatalities, which need to be urgently addressed. As a woman has to go through different stages during childbirth, in each stage, it is absolutely necessary that the mother gets total care for her and

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In vitro generation of pharmaceutically important medicinal plants using Silver Nanoparticles: A concise Review

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ABSTRACT

Plant tissue culture plays an extremely important role in contemporary plant biotechnology due to its potential for mass production of enhanced crop varieties and high yield of significant secondary metabolites. Utilizing biotic and abiotic elements, several attempts have been made to increase the efficiency and output of plant tissue culture. Due to its efficacy in microbial cleaning and the increase of secondary metabolites, the use of nanoparticles as elicitors has recently attracted interest on a global scale. Nanoparticles are objects with a nanometric dimension; they have distinct physico-chemical characteristics. Among all nanoparticles, silver nanoparticles (AgNPs) are well-known for their antibacterial and hormetic properties, which, in the right doses, improved plant biomass and promoted the accumulation of secondary metabolites. The assessment of the application of nanotechnology to plant tissue culture is the main objective of this review. The emphasis is placed mostly on the augmentation of secondary metabolites, their impacts on plant development and biomass accumulation, as well as their potential mechanisms of action.

Key words: *Plants, Secondary metabolites, Silver Nanoparticles, Tissue culture*

Introduction

In the 21stcentury, plant biotechnology has fulfilled various expectations of modern science to improve the quality of plants through tissue culture technique. In this technique plant cells, tissues or organs are grown in the artificial nutrition media under a controlled environment and aseptic condition for the generation of *in vitro* plants. This technique is very much useful to improve agriculturally produced crop varieties for enhancement of their crop quality, yield, resistant ability against environmental stress and pathogenic attack to develop disease free *in vitro* plants (Ali *et al*., 2016; Singh, 2018; Bidabadi and Jain, 2020). The enormous success behind the plant tissue culture is only because of 'Totipotency' i.e., ability of a plant cell to regenerate whole plant through cell division and cell differentiation, unlike animal cell (Ali *et al*., 2016; Bidabadi and Jain, 2020). The presence of secondary metebolites like alkaloids, phenolics, steroids, volatile oils etc in pants have made them meridionally so important (Fouad *et al.,* 2021; Khan *et al.,* 2021). The quantity of secondary metabolites in plants has been enhanced through plant tissue culture and those *in vitro* derive plants are useful for pharmacological as well as industrial purposes (Rahmawati *et al*., 2022). The quantity of secondary metabolites in plants can

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Effects of Light Pollution on Macroscopic Living System: A Concise Review

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Abstract: The growing worldwide population has increased the demand for housing development in cities, suburbs, and rural locations. This tendency, combined with the slow but steady march of urbanization and globalization, has given rise to a distinct "night lifestyle" in which people engage in various recreational activities late at night and early in the morning. While much research and intervention has focused on air, water, soil, and noise pollution, light pollution has yet to get much attention. Light pollution has an impact on various physiological, behavioural, psychological, and ecological processes in both land and marine environments. This review will investigate the numerous forms and sources of light pollution, and its wide-ranging consequences on plants, animals, and human health. By doing so, this review paper hopes to raise awareness of the seriousness of light pollution issues and their influence on daily life.

Keywords: Ecosystem, Light pollution, Living organisms, Physiological activities

Citation: Mal Kalan, Paul Anirban and Malakar Chandrik: Effects of light pollution on macroscopic living system: A concise review. Intern. J. Zool. Invest. 9(2): 396-400, 2023.

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Introduction

Outdoor lighting has an unexpected side effect known as light pollution, which happens when artificial light is used excessively and inappropriately. Sky glow, trespass, glare, uplight, and clutter from city lights are the five overlapping elements of light pollution (Kaushik *et al*., 2022). Light pollution is defined by Rich and Longcore (2006) as artificial light that interferes with natural light cycles (such as the day and night cycle and seasons), changes the nocturnal component of the environment, or illuminates the environment, and thus affects behaviour, biological rhythms, physiological processes, and ecosystems. Ecologists use the phrase "ecological light pollution" to emphasise the negative impact of excessive unwanted artificial light on natural biodiversity, which leads to an unbalanced ecosystem (Longcore and Rich, 2004).

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Controlling optical bistability, multistability and all-optical switching through multi-photon excitation process

Suman Garain[1], Suman Mondal[2,3], Kalan Mal[4], Subhasish Roy[1] and Amitava Bandyopadhyay[1,*]

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Abstract

We present a theoretical study on optical bistability (OB), optical multistability (OM) and tunable all-optical switching in a four-level cascade type atomic system. The density matrix formalism is used to find out the response of the probe laser field. We explore OB and OM under unidirectional optical ring cavity configuration. A comparison between the effects of electromagnetically induced transparency and electromagnetically induced absorption windows on OB is presented. The threshold of OB and the hysteresis width can be tuned effectively by adjusting the applied coherent fields. A transition from OB to OM and vice-versa can be easily achieved by tuning the field parameters and the atomic cooperation parameter. Dynamic control of the probe laser propagating through the medium has been investigated. We also demonstrate conversion of a continuous wave input probe field into output switched pulse. The ON/OFF time of the switched probe pulse can also be controlled by tuning the field parameters.

Keywords: three-photon transition, electromagnetically induced absorption, optical bistability, optical multistability, all-optical switching

(Some figures may appear in colour only in the online journal)

1. Introduction

Optical bistability (OB) and optical multistability (OM) have drawn huge attention from the researchers over the last few decades. OB was first observed by Gibbs *et al* in 1976 [1] while working with sodium filled Fabry–Perot cavity. Since then, the researchers have shown great interest in OB due to the variety of its potential applications in optoelectronic devices [2–4] and all-optical devices such as all-optical switches, transistors, memory elements, logic circuits etc [5–7]. OB has been studied both theoretically [8–19] and experimentally [20–25] in various two-level and three-level atomic systems. Using three-level atomic systems, Harshawardhan and Agarwal demonstrated that field-induced-transparency and quantum interference effects could significantly decrease the OB threshold [9]. The effects of the phase fluctuation [10, 11] and squeezed state fields [12–14] on the OB have also been studied subsequently. Li discussed the effects of the microwave field and the coupling field on the threshold intensity of bistablity and hysteresis [15]. The effect of spontaneously generated coherence (SGC) on OB has also been studied widely [16–18]. Joshi and Xiao reported the observation of OM in three-level Λ-type rubidium atoms kept in an optical ring cavity [22]. They also studied temperature dependence of the input-output characteristics

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Contents

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Coleridge's "Kubla Khan": A Stylistic Reading

Susanta Kumar Bardhan

Abstract

Stylistics endeavours to comprehend a text by studying its linguistic features in the context in which they have been used. In the present paper, as the title indicates, our attempt will be to explore how artistically and creatively the poet S. T. Coleridge has utilized the several stylistic devices in this poem in order to convey his earnest love for art, the perfect and rare manifestation of man's wisdom in his famous poem "Kubla Khan". First a brief discussion on stylistics will be made so that readers (who do not have or have less knowledge about this subject) can have a basic knowledge about this discipline of literary study. Then we will try to make a detailed stylistic study of the poem. This study, it is sincerely expected, will help us understand and feel at the heart of hearts the creative use of language in a literary artifact and guide us how to use this study for teaching the poem in a better attractive means.

Keywords : Linguistics; Structuralism; New Criticism; Practical Criticism; Russian Formalism; Stylistics; Foregrounding

Introduction

Literature and Linguistics are now no longer regarded as separate methodological studies the one employing merely subjective and impressionistic techniques and the other employing scientific and objective ones. Earlier approaches to the study of literature were confined only to the explanation and interpretation of the content of the texts and consequently these approaches relied heavily on the biographical, historical, moral, and philosophical and such other content based aspects of the writings which are said to be in the background of the making of a text. These approaches looked at a text solely on the basis of the extra-textual and the background knowledge available about them. But with the advent of modern linguistics

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প্রচ্ছদ ঃ
সৃষ্টি সুখের উল্লাসে
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নামাঙ্কন ঃ
স্বপন রায়, বীরভূম

মুদ্রণ ঃ কমলা প্রিন্টার্স
বড়বাগান। সিউড়ী
মোঃ ৯৩৩২০৭১১৩৮

মূল্য—পঞ্চাশ টাকা

এই সংখ্যার বিষয় সূচী

পরাগমিলনে তাপ উৎপাদনকারী উদ্ভিদ

অনির্বাণ পাল

পৃথিবী প্রাণের ছোঁয়াতেই প্রাণবন্ত। অন্যান্য গ্রহ থেকে এখানেই ধরণীর বিশিষ্টতা যে সে প্রাণের ধারিকা। প্রকৃতি তার এই প্রাণের স্পন্দন ছড়িয়ে দিয়েছে বহুকিছুর মধ্যে ; সেগুলিকে মূলত আমরা দুটি শ্রেণিতে বিভক্ত করতে পারি —প্রাণীজগৎ এবং উদ্ভিদজগৎ। তবে এই উদ্ভিদ জগতের যে প্রাণ আছে তা বুঝতে আমাদের কয়েক হাজার বছর সময় লেগে গেছে আচার্য জগদীশচন্দ্র বসুর দেখানো পথের মাধ্যমে। তবে শুধু প্রাণ নয় ; প্রাণের সঙ্গে বুদ্ধির সমন্বয় প্রাণীজগৎকে উদ্ভিদজগৎ থেকে উৎকৃষ্টতর করে তুলেছে। তারা স্বাধীন জীবন ধারণের জন্য বহুরকমের কৌশল অবলম্বন করে। কিন্তু উদ্ভিদের না আছে মস্তিষ্ক, না আছে বুদ্ধি, তবুও তারা অভিযোজনগত দিক থেকে প্রাণীজগৎ থেকে খুব একটা পিছিয়ে নেই। তারা খাদ্য আহরণ, বংশবিস্তার, আত্মরক্ষা প্রভৃতির জন্য এমন অদ্ভুত কিছু কৌশল গ্রহণ করে সেগুলি আজও আমাদের মতো উন্নত বুদ্ধিমান প্রাণীকেও তাক লাগিয়ে দেয় ; যেমন লজ্জাবতী গাছের পাতা স্পর্শ করামাত্র পাতাগুলো বুজে যায়, পতঙ্গভুক উদ্ভিদদের খাদ্য অন্বেষণের জন্য পতঙ্গধরার পদ্ধতি, খাদ্য আহরণের জন্য মনেট্রপা নামক উদ্ভিদের মৃতজীবিতা, ম্যানগ্রোভ জাতীয় উদ্ভিদের বংশবিস্তারের জন্য জরায়ুজ অঙ্কুরোদ্গম পদ্ধতি প্রভৃতি।

যদিও এই সমস্ত ঘটনার ব্যাখ্যা আমাদের সবারই জানা তবু এখনও উদ্ভিদগোষ্ঠীর মধ্যে অনেক অভূতপূর্ব বিরল ঘটনা বর্তমান যার ব্যাখ্যা এই একবিংশ শতাব্দীতে এসেও আজও আধুনিক বিজ্ঞান প্রকৃতভাবে দিতে অক্ষম। এই প্রবন্ধে এইরকম এক অজানা বিরল ঘটনার কথা আলোচনা করব।

আমরা জানি এই বিশ্বে প্রাণী ও উদ্ভিদ জগতের মধ্যে মূলত উন্নত শ্রেণির প্রাণীরা তাদের শরীরের আভ্যন্তরীণ তাপমাত্রাকে ধ্রুবক রাখে এবং যা বহিঃপরিবেশের তাপমাত্রার উপর নির্ভর করে না— যেমন পক্ষী, স্তন্যপায়ী শ্রেণির প্রাণী। কিন্তু উদ্ভিদগোষ্ঠীরা মূলত তাদের দেহের আভ্যন্তরীণ উষ্ণতাকে

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মূল্য—পঞ্চাশ টাকা

রবিচ্ছায়া ঃ রবীন্দ্রনাথের গানের প্রথম সংকলন গ্রন্থ

পিংকী মণ্ডল

কবিতাকে যে বাচস্পতি মহাকবি জেনেছিলেন 'আজন্মের প্রেয়সী' হিসাবে — সেই রবীন্দ্রনাথই পরিণত বয়সে উচ্চারণ করেছিলেন,

"মুক্তি যে আমারে তাই
সংগীতের মাঝে দেয় সাড়া।"

গান ছিল তাঁর 'শেষ পারানির কড়ি' তাই তাঁর গান লিখতে যেমন গভীর আনন্দ হয় এমন আর কিছুতেই হয় না। এমন কি বিশেষ কাজের গুরুত্বও ভুলে যেতেন তিনি গান লেখার নেশায়। 'পশ্চিমযাত্রীর ডায়েরী'তে এই কথাগুলিই লিখেছিলেন রবীন্দ্রনাথ। রবীন্দ্র প্রতিভার অনেকটাই লিরিকধর্মী, তিনি একজন গীতিকবি। যার ধর্মই হল সূক্ষ্ম সংবেদনশীল মন্ময়তার। তীব্র নিবিড় অনুভূতি থেকে কবি গান রচনা করেছেন। এককভাবে গান রচনার পাশাপাশি কখনো বা ছোট ছোট রসঘন গীতিকবিতাকে দিয়েছেন সঙ্গীতরূপ—তাদের বাণী যেমন উজ্জ্বল ; চিত্রকল্প যেমন লাবণ্যময় ; সুর ও তালও তেমন বৈচিত্র্যপূর্ণ। 'জাপান যাত্রী' তে ১৪ সংখ্যক রচনায় রবীন্দ্রনাথ বলেছিলেন— "ছবি জিনিসটা হচ্ছে অবনীর, গান জিনিসটা গগনের। অসীম যেখানে সীমাহীনতায় সেখানে গান। রূপরাজ্যের কলা ছবি, অরূপ রাজ্যের কলা গান"

প্রতিভার সূচনাকাল থেকেই মোটামুটি ভাবে গান লিখবার সূত্রপাত ঘটে গেছিল। অন্যান্য সৃষ্টিকর্মের পাশাপাশি চলেছে গান লেখা ; মাঝে মাঝে সুর সংযোজনও। ১৩৩৮সালের ২৫শে বৈশাখ (১৯৩৯) রবীন্দ্রনাথের সত্তর বছরের জন্মদিন আম্রকুঞ্জে বেশ আড়ম্বরের সঙ্গে পালিত হয়। এখানে একটি প্রস্তাবে রবীন্দ্রনাথের সব গানগুলি নিয়ে একটি সংকলন প্রকাশ করবার কথা বলা হয়। রবীন্দ্রনাথের কাছেও এটা অত্যন্ত আনন্দের বিষয় হয়ে ওঠে। অথচ পঞ্চাশ বছর বয়সে 'জীবনস্মৃতি'তে লিখেছিলেন, 'চিরকালই গানের বই ছাপাইতে সংকোচ বোধ করি। কেন না, গানের বহিতে আসল জিনিসই বাদ পড়িয়া যায়। সংগীত বাদ দিয়া সংগীতের বাহনগুলিকে সাজাইয়া রাখিলে কেমন হয়, যেমন গণপতিকে

অবকাশ

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১৪২৬

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প্রাপ্তিস্থান : ১) অবকাশ দপ্তর সিউড়ি
২) পাতিরাম বুক স্টল, কলেজ স্ট্রিট
৩) ধ্যানবিন্দু, কলেজ স্কোয়ার
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রবীন্দ্রনাথ ও চলচ্চিত্র

পিংকি মণ্ডল

রবীন্দ্রনাথের আশি বছরের জীবনব্যাপী বিরামহীন সৃষ্টির প্রবাহে এমন কোনো ক্ষেত্র নেই যেখানে তাঁর অস্তিত্ব অনুপস্থিত। কবিপ্রতিভা যেমন সাহিত্য, সংগীত, চিত্রকলা, রাজনীতি, সাংগঠনিক কাজে সাফল্যের একটি বিন্দুতে পৌঁছেছে, চলচ্চিত্র সম্পর্কে কবির চিন্তাভাবনা তেমন চূড়ান্ত পর্যায়ে না পৌঁছলেও এই জীবন সীমায় রবীন্দ্র প্রতিভার প্রকাশ ও বিকাশের ধারায় অনিবার্যভাবে প্রবেশ ঘটেছিল চলচ্চিত্রের।

রবীন্দ্রনাথের সঙ্গে চলচ্চিত্রের যোগ খুঁজতে গেলে দুটি দিক থেকে দেখান যেতে পারে—প্রথমত, রবীন্দ্রনাথের সঙ্গে চলচ্চিত্রের প্রত্যক্ষ যোগের ক্ষেত্রে আমাদের অবলম্বন হতে পারে রবীন্দ্রনাথের নিজের লেখা চিত্রিপত্র, বিভিন্ন সংবাদপত্রে প্রকাশিত তথ্য, বিভিন্ন সাময়িকপত্র, বিভিন্ন ব্যক্তির স্মৃতিকথা, চলচ্চিত্র ও সাহিত্যের ইতিহাস বিষয়ক গ্রন্থাদি, বিভিন্ন দেশ থেকে প্রকাশিত রবীন্দ্রনাথ সংক্রান্ত তথ্য ও মূল্যায়ন সম্বলিত গ্রন্থাদি এবং রবীন্দ্রনাথের সান্নিধ্য ধন্য বিভিন্ন ব্যক্তির সঙ্গে লেখকের আলোচনা ও সাক্ষাৎকারের সাহায্যে। দ্বিতীয়ত, রবীন্দ্রনাথের সঙ্গে চলচ্চিত্রের পরোক্ষ যোগের ক্ষেত্রটি তাঁর সাহিত্যভিত্তিক চলচ্চিত্রায়নের মধ্যেই সীমাবদ্ধ। রবীন্দ্রজীবদ্দশা থেকেই শুরু হয়েছিল রবীন্দ্রসাহিত্যের চলচ্চিত্রায়ণ। বিভিন্ন পরিচালক বিভিন্ন সময় বিভিন্ন দৃষ্টিভঙ্গী থেকে রবীন্দ্রনাথের রচিত ছোটোগল্প, নাটক ও উপন্যাসকে চলচ্চিত্রে রূপায়িত করেছেন।

চলচ্চিত্রের উদ্ভাবক লুমিয়ের ভ্রাতৃদের কাছে চলচ্চিত্র ছিল 'সায়েন্টিফিক কিউরিওসিটি'। জনমনের এই কৌতূহল মেটানোর সঙ্গে সূচনালগ্ন থেকেই তাঁরা এর সঙ্গে যুক্ত করেছিলেন তাঁদের তীক্ষ্ণ ব্যবসায়িক বুদ্ধি। 'সিনেমাটোগ্রাফি'র (১৮৯৫) আবিষ্কারলগ্ন থেকেই তাঁরা 'চলচ্চিত্র'কে সারা পৃথিবীতে ব্যবসা হিসাবে ছড়িয়ে দিয়েছিলেন। বাঙলাদেশেও চলচ্চিত্রের সূচনালগ্ন থেকেই ব্যবসায়িক দিকটিই প্রাধান্য পেয়েছিল। গড়ে উঠেছিলো অনেক 'বায়োস্কোপ' কোম্পানি। ধীরে ধীরে অনেকেই এগিয়ে এলেন চলচ্চিত্র নির্মাণে ও প্রদর্শনে। চলচ্চিত্রকে কেন্দ্র করে এখানেও গড়ে উঠল এক বিনিয়োগনির্ভর ইণ্ডাস্ট্রি।

চলচ্চিত্রের এই বিকাশলগ্নে রবীন্দ্রনাথ ছিলেন নানা কর্মে বিভোর। চলচ্চিত্র নিয়ে দেশ-বিদেশের মানুষের যে উন্মাদনা তিনি দেখেছিলেন, তা প্রথম দিকে তাঁর বিশেষ

সমান্তরাল

সাহিত্য • বিজ্ঞান • সমাজবিজ্ঞান

ক্রোড়পত্র: রাজশেখর বসু

অক্টোবর ২০১৮ ।। অষ্টম বর্ষ ।। প্রথম ও দ্বিতীয় সংখ্যা

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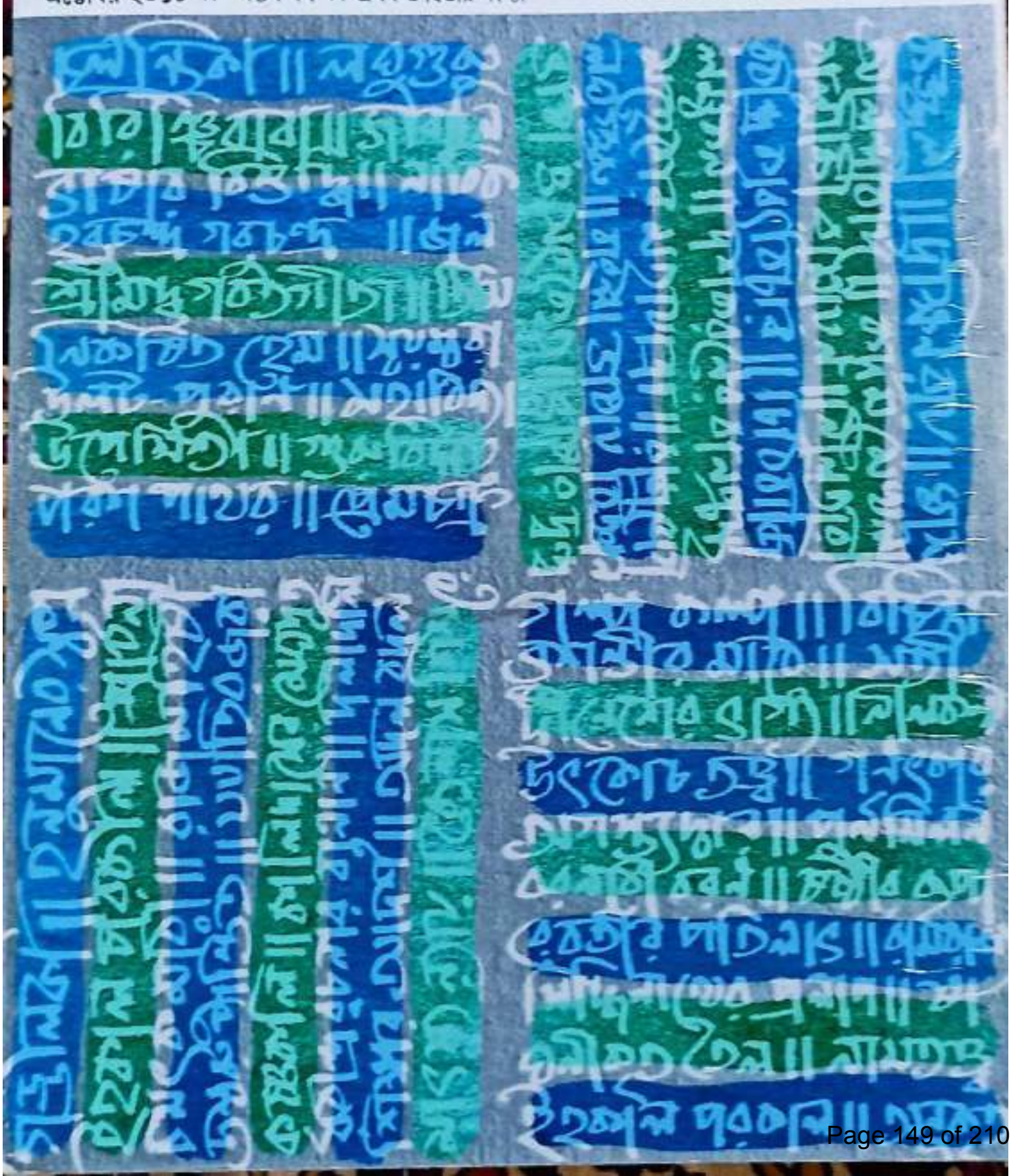

অগ্রন্থিত রাজশেখর

উজ্জ্বল গঙ্গোপাধ্যায়

রাজশেখর বসুর তিরোধানের পর তাঁর অপ্রকাশিত এবং অগ্রন্থিত লেখা আজ পর্যন্ত খুব বেশি পাওয়া যায়নি। কারণ রাজশেখর বসুর শত্রু-মিত্র সকলেই স্বীকার করেছেন, রাজশেখর অত্যন্ত পরিপাটি গোছানো স্বভাবের মানুষ। অফিসে, সংসারে, সাহিত্যে সর্বত্র তাঁর এই পরিপাটি স্বভাবের ছাপ বর্তমান। 'কথাসাহিত্য' ও 'যষ্টিমধু' পত্রিকার রাজশেখর সখ্যায় তাঁর ঘনিষ্ঠরা স্মৃতিচারণ প্রসঙ্গে তেমন বিবিধ দৃষ্টান্ত দিয়েছেন। পারফেকশন, পরিচ্ছন্নতা ও শ্রীর উপাসনা রাজশেখরের একান্ত স্বভাব। তাঁর হাতে লেখা 'শ্রীমদ্ভগবদ্গীতা' ও 'হিতোপদেশের গল্প'-এর পাণ্ডুলিপি থেকে ছবি নিয়ে তা গ্রন্থকারে প্রকাশ করা সম্ভব হয়েছে। সে পাণ্ডুলিপি এতটাই শৈল্পীক। ছাপার আগে তিনি বলে দিতে পারতেন তাঁর বইটি কত ফর্মা হবে, কোন পাশে কতটা ছাড় থাকবে। মলাটও হত তাঁর নির্দেশে। তাঁর গল্প ও প্রবন্ধ পুস্তকাকারে প্রকাশের সময় খুব সামান্যই পরিবর্তিত হত। সে পরিবর্তনের উদ্দেশ্য আরো পারফেকশন, তাতে মূল বিষয়ের চরিত্রগত বদল হত না। ব্যতিক্রম একটি গল্প। প্রবাসী, আশ্বিন ১৩৩৬-এ 'গল্পিকা' হিসাবে চারটি ছোট-ছোট গল্প প্রকাশিত হল। তার একটির নাম 'রাতারাতি'। পরের বছর 'প্রবাসী' আশ্বিন ১৩৩৭-এ প্রকাশিত হল 'ছেলেধরা' গল্প। ১৩৪৪-এ 'হনুমানের স্বপ্ন ইত্যাদি গল্প' গ্রন্থ প্রকাশের সময় ঐ গল্প দুটি জুড়ে ও সংশোধন করে 'রাতারাতি' গল্প প্রকাশিত হল। এছাড়া 'ভারতবর্ষ' আষাঢ় ১৩৩২-এ প্রকাশিত 'বাংলার ভদ্রলোক' প্রবন্ধটি 'লঘুগুরু' গ্রন্থে 'ভদ্র জীবিকা' নামে মুদ্রিত। 'লঘুগুরু'র 'রবীন্দ্র পরিবেশ' প্রবন্ধটির পাণ্ডুলিপিতে নাম 'কবিগুরু'। 'কথাসাহিত্য' কার্তিক ১৩৬৩ তে প্রকাশিত 'ভেড়া' গল্পটি 'আনন্দীবাঈ ইত্যাদি গল্প' গ্রন্থে 'কামরুপিণী' নামে প্রকাশিত। সচেতন লেখক হওয়ার কারণেই হয়তো তাঁর লেখায় বড়সড় পরিবর্তনের এমন উদাহরণ খুব বেশি মিলবে না। যদিও খুঁটিয়ে পড়লে দেখি, ছোটোখাটো নানা সংশোধন করেছেন আরো পারফেকশনের জন্য।

'ভারতবর্ষ' পত্রিকার ১৩২৯ মাঘ সংখ্যায় বিয়াল্লিশ বছর বয়সে পরশুরামের আবির্ভাব।

লেখক বহুদিন রাজশেখর চর্চায় নিয়োজিত। প্রকাশিত গ্রন্থ— পরশুরামের গল্প: দ্বন্দ্ব ও সমন্বয়।
ugangopadhyay66@gmail.com

পরশুরাম ও রাজশেখর বসুর গ্রন্থপঞ্জি

উজ্জ্বল গঙ্গোপাধ্যায়

১) গড্ডলিকা,পরশুরাম (যতীন্দ্রকুমার সেন বিচিত্রিত)। প্রকাশক শ্রী ব্রজেন্দ্রনাথ বন্দ্যোপাধ্যায়, ১৪ পার্শীবাগান, কলিকাতা। ১৩৩১। ১৪৮ পৃষ্ঠা। মূল্য পাঁচসিকা।

[সূচী: শ্রীশ্রীসিদ্ধেশ্বরী লিমিটেড, ভারতবর্ষ, মাঘ ১৩২৯, পৃ ২৪৯; চিকিৎসা-সঙ্কট, ভারতবর্ষ, কার্তিক ১৩৩০, পৃ ৭৫৩; মহাবিদ্যা, ভারতবর্ষ, ফাল্গুন ১৩২৯, পৃ ৪২৫; লম্বকর্ণ, ভারতবর্ষ, কার্তিক ১৩৩১, পৃ ৭১৭; ভুশণ্ডীর মাঠে, ভারতবর্ষ, ফাল্গুন ১৩৩০, পৃ ৪৩৫]

২) কজ্জলী, পরশুরাম, (প্রথম প্রকাশ ১৩৩৫)।

[সূচী: বিরিঞ্চিবাবা, ভারতবর্ষ, আশ্বিন ১৩৩২, পৃ ৬৫৮; জাবালি, ভারতবর্ষ, কার্তিক ১৩৩৩, পৃ ৮৮১; দক্ষিণরায়, প্রবাসী, পৌষ ১৩৩৩, পৃ ৪১৩; কচি-সংসদ, প্রবাসী, মাঘ ১৩৩২, পৃ ৪৩৪; উলটপুরাণ]

৩) চলন্তিকা, রাজশেখর বসু। প্রকাশক সুধীরচন্দ্র সরকার, ১৪ কলেজ স্কোয়ার, কলিকাতা। (১৯৩০/১৩৩৭)। ১ + ৭ + ৬৪২ পৃষ্ঠা। মূল্য দু টাকা বারো আনা।

৪) হনুমানের স্বপ্ন ইত্যাদি গল্প, পরশুরাম (যতীন্দ্রকুমার সেন বিচিত্রিত)। এম.সি. সরকার অ্যান্ড সন্স লিঃ, ১৫ কলেজ স্কোয়ার, কলিকাতা। বৈশাখ ১৩৪৪। ১৫৯ পৃষ্ঠা। মূল্য দেড় টাকা।

[সূচী: হনুমানের স্বপ্ন, ১৩৩৭; পুনর্মিলন, প্রবাসী, আশ্বিন ১৩৩৬; উপেক্ষিত, প্রবাসী, আশ্বিন ১৩৩৬; উপক্ষিতা, প্রবাসী, আশ্বিন ১৩৩৬; রাতারাতি, প্রবাসী, আশ্বিন ১৩৩৬, পৃ ৮৮৫-৮৯০ (প্রবাসী, আশ্বিন ১৩৩৭ পৃ ৭৮৬ তে প্রকাশিত 'ছেলেধরা' নামক গল্পটির সাথে ১৩৩৬ আশ্বিনে প্রকাশিত 'রাতারাতি'কে সংযুক্ত ও সংশোধিত করে এই গ্রন্থের 'রাতারাতি' গল্পটি তৈরি হয়েছে); গুরুবিদায়, উত্তরা, অগ্রহায়ণ ১৩৩৭; মহেশের মহাযাত্রা, প্রবাসী, আষাঢ় ১৩৩৮, পৃ ৩০০; প্রেমচক্র, সাপ্তাহিক ছোটগল্প, শারদীয় ১৩৩৯]

[দ্বিতীয় সংস্করণে নতুন সংযোজন-দশকরণের বাণপ্রস্থ, বিশ্বভারতী পত্রিকা, পৌষ ১৩৪৯; তৃতীয় দ্যূতসভা, বিশ্বভারতী পত্রিকা, ১৩৫০, পৃ ১২৮]

৫) লঘুগুরু/প্রবন্ধাবলী, রাজশেখর বসু। রঞ্জন পাবলিশিং হাউস, ২৫/২ মোহনবাগান রো, কলিকাতা। আষাঢ় ১৩৪৬। ১১৪ পৃষ্ঠা। মূল্য এক টাকা।

[সূচী: নামতত্ত্ব, ভারতবর্ষ, শ্রাবণ ১৩৩০, পৃ২২২; ডাক্তারি ও কবিরাজি, আশ্বিন ১৩৩১; ভদ্র

রাজশেখর / পরশুরাম চর্চাপঞ্জি

উজ্জ্বল গঙ্গোপাধ্যায়

গ্রন্থ

উজ্জ্বল গঙ্গোপাধ্যায়: পরশুরামের গল্প: দ্বন্দ্ব ও সমন্বয়। কলকাতা: পুস্তক বিপণি, ২০১১।

কল্যাণী ঘোষ: রাজশেখর বসু: জীবন ও সাহিত্য। কলকাতা: ফার্মা, কে এল এম, ১৯৮৩।

জ্যোৎস্না গুপ্ত: পরশুরামের গল্প: মনন ও শিল্প। কলকাতা: পুস্তক বিপণি, ১৯৮৫।

দীপক গোস্বামী: পরশুরাম-চরিত। কলকতা: এম সি সরকার, ২০১৩।

দীপক গোস্বামী: পরশুরাম-উবাচ। কলকতা: পাতাবাহর, ১৪২০।

দীপক গোস্বামী: পরশুরামের চতুঃরঙ্গ। কলকতা: এম সি সরকার, ২০১৭।

নিতাই বসু: রসশেখর রাজশেখর। হাওড়া: ফসল প্রকাশনী, ১৯৬২।

রামকৃষ্ণ ভট্টাচার্য: পরশুরাম গল্পকার। কলকাতা: অবভাষ, ২০১১।

রামকৃষ্ণ ভট্টাচার্য: পরশুরামের চরিত্রশালা। কলকাতা: অবভাষ, ২০১১।

রামকৃষ্ণ ভট্টাচার্য: পরশুরাম বিবিধ। কলকাতা: অবভাষ, ২০১২।

সঞ্জীব দাস: পরশুরামের গল্প: জীবনদৃষ্টি ও শিল্পরূপ। কলকাতা: বঙ্গীয় সাহিত্য সংসদ, ২০১২।

সন্দীপ রায় (সম্পা): যুগলবন্দি। কলকাতা: নিউস্ক্রিপ্ট, ২০১৮।

সুবোধচন্দ্র সেনগুপ্ত: হাস্যরসিক পরশুরাম। কলকাতা: এ মুখার্জী অ্যান্ড কোং, ১৩৮৬।

গ্রন্থাংশ

অজিত দত্ত: *বাংলা সাহিত্যে হাস্যরস*। কলকাতা: জিজ্ঞাসা, ১৯৬০, পৃ ৩৮৮-৪১৩।

অন্নদাশঙ্কর রায়: *সিংহাবলোকন*: রাজশেখর শতবর্ষে। কলকাতা: সাহিত্যলোক, ১৩৯১।

অন্নদাশঙ্কর রায়: *সিংহাবলোকন*: পরশুরাম। কলকাতা: সাহিত্যলোক, ১৩৯১।

অলোক রায়: *জীবনী ও গ্রন্থপঞ্জী*। কলকাতা: বাগার্থ, ১৯৭২।

আশীষ লাহিড়ী: *ভগবানের লেত্তি: ঈশ্বর না-ঈশ্বর বিজ্ঞান সমাজ*: নির্বর্ণ স্বচ্ছ দৃষ্টি? কলকাতা: গাঙচিল, ২০০৯।

আশীষ লাহিড়ী: *ভগবানের লেত্তি: ঈশ্বর না-ঈশ্বর বিজ্ঞান সমাজ*: এই মলিন বস্ত্র ছাড়তে হবে। কলকাতা: গাঙচিল, ২০০৯।

অনুষ্টুপ

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ভারতীয় উপমহাদেশে ঔপনিবেশিক সংস্কৃতির মানচিত্র

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অনুষ্টুপ

সাহিত্য ও সংস্কৃতিবিষয়ক ত্রৈমাসিক পত্রিকা

প্রাক্ শারদীয় বিশেষ সংখ্যা

ভারতীয় উপমহাদেশে ঔপনিবেশিক সংস্কৃতির মানচিত্র

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শাসকের দৃষ্টিতে

স্মৃতিকথন

বাঙালির স্বদেশচর্চা

অনুষ্টুপ/১৯৬৬-২০১৮

সম্পাদক
অনিল আচার্য

অতিথি সম্পাদক
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সহযোগী সম্পাদক
পবিত্রকুমার আচার্য

সম্পাদকীয় সহযোগী
সন্দীপন সেন

বিশেষ সহযোগী
অরুণ কর্মকার

প্রচ্ছদ: হিরণ মিত্র
রূপায়ণে: সৌম্যেন পাল

কার্যালয় সচিব: আশিস ঘোষ
সহযোগী: সুশান্ত ঘোষ

কর্মসচিব: অতীশ ঘোষ

বর্ণসংস্থাপনা: কমল পাঁজা

মুদ্রণ: বেঙ্গল ফটোটাইপ কোম্পানি
৪৬/১ রাজা রামমোহন সরণি, কলকাতা-৯

বাইন্ডার: ন্যাশনাল বাইন্ডিং হোম
১৯৮ রাজা রামমোহন সরণি, কলকাতা-৯

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ফ্রান্সিস ব্রাডলে বার্ট ও 'দি স্টোরি অফ অ্যান ইন্ডিয়ান আপল্যান্ড'

পার্থ শঙ্খ মজুমদার

বাংলা প্রদেশের মধ্য অংশের এই লম্বা ভূখণ্ডটি, যা চিত্রময় সাঁওতাল পরগণা নাম দ্বারা আখ্যায়িত, কিংবদন্তী ও রহস্যে আবৃত এক মনোমুগ্ধকর অঞ্চল। এই ভূখণ্ডের অধিবাসীগণ ও প্রচলিত আইন এই অঞ্চলেরই সম্পূর্ণ নিজস্ব। আর এই কারণেই এই ভূখণ্ড বাংলা প্রদেশের বাকি অংশের থেকে সম্পূর্ণ আলাদা। এই অঞ্চলের বন্ধুর পাহাড়শ্রেণি—যেখানে এক পাহাড়বাসী জনজাতি কর্তৃত্ব করে এবং তারা বিশ্বাস করে যে সৃষ্টির আদিকাল থেকে তারা এই অঞ্চলে কর্তৃত্ব করে আসছে—গঙ্গার গতিপথে প্রাচীরের মতো বাধা সৃষ্টি করে তার গতিপথকে পরিবর্তনে বাধ্য করেছে। ছোটোনাগপুর মালভূমির সীমান্তে অবস্থিত হওয়ায় তার অনেক প্রাকৃতিক বৈশিষ্ট্যই এই চিত্রময় ভূখণ্ডে বর্তমান। মালভূমি থেকে পার্শ্ববর্তী প্রদেশের দিকে প্রসারিত বাহুর মতো পাহাড় ও বনভূমি আবৃত এই লম্বা ভূখণ্ডটি হয় বৃক্ষ আচ্ছাদিত বন্ধুর উচ্চভূমি ও অল্প উচ্চতার উঁচু-নীচু ঢালের মধ্য দিয়ে ধীরে ধীরে নিচু হয়ে সমতল ভূখণ্ডে মিলিত হয়েছে, নতুবা হঠাৎ করে গঙ্গা নদীতে শেষ হয়েছে, যা এই ভূখণ্ডের এক অস্থির ও অনিশ্চয় সীমান্তে পরিণত হয়েছে।

—এই ভাবেই ফ্রান্সিস ব্রাডলে-বার্ট তাঁর দ্বিতীয় বই 'দি স্টোরি অফ অ্যান ইন্ডিয়ান আপল্যান্ড' শুরু করেছিলেন।

ব্রাডলে-বার্ট ছিলেন একজন ব্রিটিশ আমলা—আই.সি.এস. বা ইন্ডিয়ান সিভিল সার্ভিস পরীক্ষায় উত্তীর্ণ আমলা।[১] ১৮৭৪ খ্রিস্টাব্দের ২৫ জুন ইংল্যান্ডের ওরসেস্টারশায়ার কাউন্টির বেরো (Berrow) গ্রামে তাঁর জন্ম হয়েছিল। তাঁর পিতার নাম জর্জ ব্রাডলে-বার্ট। অক্সফোর্ড বিশ্ববিদ্যালয়ের অন্তর্গত ব্রাসেনোসে (Brasenose) কলেজ থেকে ফ্রান্সিস ১৮৯৭ খ্রিস্টাব্দে স্নাতক পরীক্ষায় উত্তীর্ণ হয়েছিলেন। স্নাতক পাঠক্রমে তাঁর সাম্মানিক বিষয় ছিল ইতিহাস। ইতিমধ্যে ১৮৯৫ খ্রিস্টাব্দে ফ্রান্সিস

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Contents

Archetypal Criticism and Indian Literature: An Overview

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1 Introduction

The present paper attempts to deql with archetypal criticism or myth criticism and this will, it is hoped, give us a better understanding of the theory as found in the existing literature. With the help of the idea to be gathered from the analysis of archetypal criticism and its application in literary analysis we will try to make a preliminary survey of literatures both in Indian English and Indian regional languages. It will make us understand the importance of this critical approach so far as Indian literatures are concerned.

2 Archetypal Criticism: A Brief Survey

Archetypal criticism is the investigation and analysis of archetypal and mythical narrative or discourse patterns, character types, themes and models in literary texts and their recurrence in those texts. But before we proceed to discuss archetypal criticism in detail, let us look at the definitions of *archetype* and *myth*. Theses definitions will help us understand the later discussion.

The word 'archetype' is derived from the two Greek words 'arche' (meaning *beginning*) and 'type' (meaning *a* model) and thus it generally means an original model or pattern. To put it in other words, 'archetype' means 'the most typical or perfect example of a particular kind of person or thing' (OALD). In literature archetypes are those images,

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LINGUISTIC INTERPRETATION OF MACBETH'S SOLILOQUIES

Susanta Kumar Bardhan

Abstract : Linguistic criticism as a branch of literary criticism attempts to utilize the insights drawn from linguistics for the interpretation, analysis, and comprehension of a literary text. Armed with the concepts and tools of linguistic criticism, we will attempt to analyze the First and Last soliloquies of Macbeth and see how the hero's mindscape is represented the language use in these.

Key words: linguistics, semantics, equivalence, syntagmatic, paradigmatic, poeticity, etc.

From the beginning of the twentieth century the language study changed dramatically. Linguistics took a new turn with the emergence of structural linguistics in Europe and America. Ferdinand de Saussure brought revolutionary concepts in his book *Cours de Linguistique Generale* (1916). Saussure proposed his famous pairs of concepts – diachrony vs synchrony, langue vs parole, signifiers vs signified and syntagmatic vs paradigmatic. At the same time the Moscow Linguistic Circle was formed in 1915 and Russian formalism flourished during 1915-30 and Prague School of Linguistics led by Roman Jacobson, Jan Mukarovsky and Rene Welleck. Their investigation also encompassed phenomena of concern to literary critics. Literary language may be viewed in cultural terms, and the formal features of creative utterances can be studied objectively to understand their operation in some general way. Thus the Prague School serves as an important link between literary criticism and linguistic criticism. Again, Sapir, Boas, Bloomfield and others in America developed structural linguistics, mainly satisfied with just identification and classification of linguistic facts.

The term *equivalence*, the key to Jacobson's poetic concept, is related to the selection and combination of items. For example, in the expression 'allotment of death' in Ted Hughes' poem *Hawk Roosting* we can see that concept of allotment which is related to 'property', 'land', 'goods' has been extended to abstract concept 'death' by the poet to project to horror attached to the bird of prey. This also attracts the attention of the readers and thereby gets *foregrounded*. By foregrounding we mean the use of any device of the language in such a way that its use itself attracts attention and is

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Interpretation of "إِنَّ ٱللَّهَ فَقِيرٌ وَنَحۡنُ أَغۡنِيَآءُ"

(Indeed, Allah is needy, while we are free of need)

✎...Maulānā Nasīm Zahīr Iṣlāḥī[1]

Tr.: Dr. Mohd. Mo'ataṣim Azmi[2]

Allah says quoting the saying of Jews in chapter Āli-'Imrān:

لَّقَدۡ سَمِعَ ٱللَّهُ قَوۡلَ ٱلَّذِينَ قَالُوٓاْ إِنَّ ٱللَّهَ فَقِيرٞ وَنَحۡنُ أَغۡنِيَآءُۘ سَنَكۡتُبُ مَا قَالُواْ وَقَتۡلَهُمُ ٱلۡأَنۢبِيَآءَ بِغَيۡرِ حَقّٖ وَنَقُولُ ذُوقُواْ عَذَابَ ٱلۡحَرِيقِ ١٨١[3]

Tr.: Allah has certainly heard the statement of those [Jews] who said 'Indeed, Allah is needy, while we are free of need.' We will record what they said and their killing of prophets without reason and will say 'Taste the punishment of the Burning Fire'."

The following incident, narrated by 'Abdullāh ibn 'Abbās is quoted in interpretation of this verse:

"One day Abū Bakr Ṣiddiīq went to a Jews' school. He saw that many people were gathered around a man named Fakhkhāṣ ibn-i-'Āzūrā' who was a great scholar of the Jews. Abū Bakr told him "Fear Allah and embrace Islam, by God! You know well that Muḥammad (PBUH) is the Messenger of Allah. He is mentioned in your Devine books of Taurāt (Psalms) and Zabūr." Fakhkhāṣ replied: O Abū Bakr! We are not dependent

[1] The author teaches Qur'ān and Ḥadīth in the famous institute of A'ẓamgarh (Madrasah al-Iṣlāḥ)

[2] Guest Lecturer, Department of Arabic, University of Burdwan, West Bengal, India, Member of IJAIS

[3] 'Āli-'Imrān: 181

A review of Combining Ayurvedic Therapy with Nanoparticles and Temporary Drugs.

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ABSTRACT

Ayurveda and other Indian medical systems use metals, although their use may also be traced back to the Chinese and Egyptian civilizations around 2500 BC. Ayurveda has been used on the Indian subcontinent since the 7th century. Bhasma is a special Ayurvedic metal/mineral preparation that is processed in a herbal juice or decoction. Herbal animal derivatives are typically administered as Bhasma. Bhasma is the Sanskrit word for burning ash. After going through a difficult washing procedure, the raw material goes through a reaction phase where additional minerals and herbal extracts are added. Bhasma refers to a variety of concepts, including preserving optimum alkalinity for optimum health and neutralizing damaging acids that cause disease. Bhasma doesn't undergo metabolization, hence it doesn't release any negative.

Keywords **- Ayurveda; bhasma; nano-particle; shodhna; marna; standardization**.

INTRODUCTION

One of the earliest medical practises on the Indian subcontinent is ayurveda. Bhasma is Suvarna Bhasma, Makhika Bhasma, Abrak Bhasma, Tamura Bhasma, and Loha Bhasma, according to the classical conjecture. These Bhasma are nanometer-sized, according to particle size studies, X-ray diffraction and transmission electron microscopy. These Bhasma are non-toxic when used in therapeutic levels and can be seen of as nanomedicine.

One billionth is the meaning of the unit prefix nano (symbol n). In the metric system, this prefix is typically used to indicate a factor of 10-9 or 0.000000001. Units of time and length are frequently used as prefixes in science and electronics [1]. With several advancements in nanoscale medicines, biosensors, implantable devices, and healthcare, nanotechnology has emerged as a major force in medical and healthcare innovation [2-3] .

Swarna Bhasma in Ayurveda:

Traditional Ayurveda remedy Swarna Bhasma (Baked Metal), also known as Suvarna Bhasma, contains nano- and colloidal gold particles. It has been used for many years in India to treat conditions like diabetes, rheumatoid arthritis, and nervous system diseases [4,5]. Due to the up to 98% gold content, it is one of the most expensive Ayurvedic medications. The ancient use of gold has been found to provide a variety of medicinal benefits, including rejuvenation, aphrodisiac, and life extension. Enhances both number and quality [6, 7] . Additional characteristics also aid in the treatment of a number of illnesses, including rheumatoid arthritis, diabetes, and nervous system issues [8] . It is also regarded as a superior heart tonic, aids in the treatment of overall weakness, low blood pressure, and diminished cardiac pumping capacity.

Floral Biology And Pollination Of Vigna Catjang Endl.

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ABSTRACT

Flower biology studies various floral characteristics, such as flowering time, flower morphology, number of stamens and type of anther dehiscence, number of pollen and ovules, presence of nectar and odor to determine reproductive success. Study the contribution of flowers to flower biology is related to pollination mechanisms. Floral biology and pollination are prerequisites for fruit and seed formation and for the development of various preservation protocols. The aim of this study is to elucidate the flower biology, flowering, pollen production and flower visitor foraging behavior of *Vigna catjang* Endl. Seeds of economically important plants belonging to the legume family and used as legumes.

Key words: Flower biology, pollination mechanisms, pollen production.

INTRODUCTION

Flower biology studies various floral characteristics, such as flowering time, flower morphology, number of stamens, type of anther dehiscence, number of pollen and ovules, presence of nectar and odor, to determine reproductive success. Study the contribution of flowers to Flower biology is related to pollination mechanisms. Pollination, the fundamental force of genetic modification of flowering plants, plays an important role in plant breeding programs. In angiosperms, the pollination machinery usually develops in three stages: the release of pollen from the anther, the movement of pollen from the anther to the stigma, and finally the normal placement of the pollen on the surface of the stigma, followed by pollen germination. The pollen grains that make up the next stage begin fertilization. The evolutionary success and survival of angiosperms depends on the efficiency of their reproductive capacity, and plants have evolved a wide range of reproductive strategies to optimize fitness.

Detailed knowledge of flower biology and pollination is therefore a prerequisite for fruit and seed formation and for the development of various preservation protocols.

The purpose of this study is to elucidate flower biology, flowering, pollen production, and visitor foraging behavior in Vigna catjang Endl. It belongs to the legume family and is an economically important plant whose seeds are used as legumes. In the form of sweets, it is used for leukemia and low energy. Cowpea has been a staple food and an important source of protein in many cultures since the Roman Empire. It was the most widely grown bean for human consumption in the old World (Khare 2007, Allen and Allen, 1981).

MATERIAL AND METHODS

Different flowering seasons, such as flowering, anther dehiscence, and pollen release, were examined using methods proposed by Mathur and Mohan Ram (1986), Reddi *et*. al. (1988). Pollen productivity, evaluation, and the role of flower visitors in pollination were studied using methods proposed by Mandal and Chanda (1981). Descriptions and terminology for pollen morphology, and stigmatization, were developed accordingly by Erdmann (1960), Heslop Harrison and Sivannah (1977) and Heslop Harrison (1981). Pollen

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একমুখ

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এই সংখ্যার বিষয় সূচী

সর্বোদয় আন্দোলন ও গান্ধীজির বইপড়া

সুশান্ত রায়

মোহনদাস করমচাঁদ গান্ধী—মহাত্মা গান্ধী চর্চার পরিসর বিস্তৃত। অনন্ত জলাধারের মতো। গান্ধীজি এমন এক মানুষ, যিনি তাঁর সমগ্র জীবনকে সত্যের এক গবেষণাগার রূপে তুলেছিলেন। অস্বীকার করার উপায় নেই, ভারতের স্বাধীনতা আন্দোলনে গান্ধীজির মতন সর্বজনমান্য নেতা ছিল না। একটা সময় ভারতীয় রাজনীতিতে তিনিই ছিলেন শেষ কথা। গান্ধীজির সুগভীর ঈশ্বরভক্তি, সত্য ও অহিংসার প্রতি অনুরাগ, অনাড়ম্বর জীবনের প্রতি আকর্ষণ, মানবপ্রেম—সবই তাঁর সর্বোদয় চিন্তার অনুসারী।

মহাত্মাজির ধ্যানের ভারত সর্বোদয়ের ভিত্তির উপর প্রতিষ্ঠিত। জগতকে সুখময় ও শান্তিময় করে তুলবার সত্যের উপর অধিষ্ঠিত এক ভাবধারাই সর্বোদয়। 'সর্বোদয়' —কথাটির অর্থ সকলের উদয়। শোষণ-বঞ্চনাহীন সকলের অধিকার ও মূল্যযুক্ত যে সম-সমাজের কল্পনা গান্ধীজি করেছিলেন এবং যার জন্য সমগ্র জীবন অতিবাহিত করেছেন, তা এই সর্বোদয়-এরই সমাজ। মানুষকে ভালবেসে এবং পবিত্র জীবনাচরণের মধ্য দিয়ে প্রমাণ করেছিলেন 'সর্বোদয়' একটি অবাস্তব অলীক কল্পনা নয়, বাস্তবের পরিসরেই তার রূপটি উপলব্ধি করা সম্ভব।

গান্ধীজি পরিকল্পিত সর্বোদয় সমাজব্যবস্থায় শোষণের জন্য ধনীর অর্জন নয়, তা সর্বসাধারণের কল্যাণের জন্য। শক্তিশালী ব্যক্তির বল বা ব্যক্তি পীড়নের জন্য নয়, তাহল দুর্বলকে রক্ষা করার জন্য। ধনী তার সম্পত্তিকে, ধনকে সমাজের মঙ্গলের জন্য নিজের কাছে রাখা গচ্ছিত সম্পদ বলে মনে করবে। ধনী হল এই ধনের অছি অভিভাবক মাত্র, তার বেশী কিছু নয়। ধনীর ধন যদি নিজের প্রয়োজনে ব্যবহৃত না হয়ে সকলের মঙ্গলের জন্য ব্যবহৃত হয় তাহলে সেই সমাজে দরিদ্র বলে কেউ থাকবে না। কিন্তু সবচেয়ে আগে প্রয়োজন সব সমান অধিকারকে স্বীকার করা এবং তার জন্য সচেষ্ট হওয়া। সর্বোদয়ের মূল আছে এই সমান অধিকারের ভাবনা।

'হরিজন' পত্রিকায় ১৮-০১-১৯৪৮ তারিখে গান্ধীজি লিখেছিলেন— – 'সর্বোদয়' অর্থাৎ বাস্তব সম্মত প্রকৃত গণতন্ত্র যদি সত্যিই কার্যকর হয় তাহলে দেখতে পাওয়া যাবে, সকল ভারতবাসীই সমভাবে দেশশাসনের অধিকার পেয়েছে। এই অধিকারের ক্ষেত্রে অতি দীন দরিদ্র লোক এবং মহাসম্পদশালী ব্যক্তি সমান। কিন্তু এর জন্য প্রতিটি মানুষকে সৎ হতে হবে।... সবাই সবাইকে সমান বলে মেনে নিয়ে প্রেম এবং বন্ধুত্বের বন্ধনে আবদ্ধ হবে। কেউ কাউকে অস্পৃশ্য বলে দূরে সরিয়ে রাখবে না। উদয়াস্ত পরিশ্রম করা সাধারণ শ্রমিক এবং মহাসম্পদশালী পুঁজিপতিদের আমরা সমান চোখে দেখব। মাথার ঘাম পায়ে ফেলে জীবিকা অর্জন করার প্রতি সবাই শ্রদ্ধাশীল হয়ে উঠবে, ফলে কায়িক আর মানসিক শ্রমের মধ্যে কোন পার্থক্য থাকবে না।' (সর্বোদয়, শ্রী অমলেন্দু বাগচীর গুপ্ত অনুবাদ) পাশাপাশি সর্বোদয়ের মর্মমূলে আছে অহিংসা। কারণ সর্বোদয় যেহেতু সকলেরই কল্যাণ চায় সেই কারণে সর্বোদয়ের পরিকল্পনায় হিংসার কোন স্থান হতে পারে না। হিংসা ভেদযুক্ত, অহিংসা মিলনাত্মক। গান্ধীজির সর্বোদয়ে আছে এই মিলনের বার্তা। এক মহামিলনের বাণী তাতে বিঘোষিত। আর ঈশ্বরেরও অভিপ্রায় হল মানুষের এই মহামিলন। ঈশ্বরের চোখে কেউ অধম নয়, কেউ পরিত্যাজ্য নয়।

লিও টলস্টয় বলেছিলেন— জীবনে মাত্র তিনটি জিনিষের প্রয়োজন। বই, বই এবং বই। বইয়ের চেয়ে জরুরী কিছু হতে পারে না। বই হল সচেতন মানুষের বিশল্যকরণী, ছিল, আছে, থাকবে। বই-ই হল মানবসভ্যতা। অতীত, বর্তমান ও ভবিষ্যতের মধ্যে সেতুবন্ধন করতে সক্ষম একমাত্র বই। তাই 'প্রাণ ভরিয়ে তৃষ্ণা হরিয়ে' পড়তে হবে। গান্ধীজি'র বই পড়া নিয়ে এ আমাদের আলোচনা এরপর অগ্রসর হবে।

গান্ধীজির জীবনের উপর গীতা ও তুলসীদাসী রামায়ণ —এই দুইখানি বইয়ের প্রভাব সকলের চেয়ে বেশি ছিল। গীতায় তিনি ধর্মের সারকথা, তাঁর জীবনের আদর্শের সন্ধান পেয়েছিলেন আর রামায়ণে সেই আদর্শের মূর্ত রূপ দেখতে পেয়েছিলেন রামচন্দ্রের চরিত্রের মধ্যে। গীতায় বলা হয়েছে স্থিত প্রজ্ঞ যোগীর কথা, যাঁর প্রজ্ঞা অর্থাৎ বুদ্ধি স্থির, সুখে দুঃখে টলে না, যিনি সবাইকে সমান দেখেন, যাঁর মনে বিন্দুমাত্র বৈরভাব অর্থাৎ শত্রুতা বা হিংসা নেই। গীতার বেশ কয়েকটি শ্লোক গান্ধীজি প্রতিদিন পাঠ করতেন।

তুলসীদাস তাঁর রামায়ণে রামরাজ্যের কল্পনা করে গেছেন। গান্ধীজির আদর্শ ছিল রামরাজ্য, যেখানে সকলেই সত্যপালন করছে, নিজ নিজ কর্তব্য করছে, রাজা তাঁর কর্তব্য করে যাচ্ছেন, প্রজা তাঁর কর্তব্য করে যাচ্ছে, কোথাও বিরোধ বা হিংসা নেই। গান্ধীজির রামধুন অর্থাৎ রামনাম কীর্তন বড় ভালবাসতেন।

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Humanistic Psychology and ESL Teaching: Some Reflections

Susanta Kumar Bardhan*

Abstract

In the second half of the 20th Century, Cognitive psychology, Chomsky's Transformational Generative Linguistics model revolutionized the field of language teaching across the world. The teaching of English ($L_{1/2}$ in terms of approach, method, materials and evaluation has no exception to this effect. ELT underwent changes from Structural or Audiolingual method of teaching to Communicative Language Teaching (CLT) which is considered to be interactive, lively and effective in the classroom teaching-learning as it focusses on the active involvement of the learners in the learning process. It is evident that CLT does not address the self-and-soul of the learner which constitutes in a way the moral, mental/ psychological, emotional, intellectual, COGNITIVE and spiritual aspects of an individual human being. Humanist psychology that arose in the 1950s onward as a reaction to the Freudian psychoanalysis, behaviourism and cognitivism addresses all the HUMAN aspects critically and comprehensively by adopting a more positive and holistic approach to human existence. It added a new dimension to all the branches of education including ELT. In the present paper we will attempt to explore how the fundamental principles of humanistic psychology have contributed to the development of WBBSE English textbooks and teaching-learning of Class IX and X based on ICON and PEACOCK Models.

Keywords: behaviourism, congitivism, humanism, ELT, linguistics, etc.

1. Introduction

In the second half of the 20th Century Cognitive psychology, Chomsky's Transformational Generative Linguistics model (which is also cognitive in nature) and other branches of linguistics such as sociolinguistics

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Amitav Ghosh's *Gun Island*: An Ecological Concern

SUSANTA KUMAR BARDHAN

Abstract. Amitav Ghosh's latest novel *Gun Island* (2019) is a fictional experimentation of his concern about climate change as conveyed in his nonfiction treatise *The Great Derangement* (2016). The story rotates round the experiences of a Brooklyn-based Indian dealer in rare books named *Dinanath* (Deen). Deen loves to lead a quiet life spent indoors but his visit to his birthplace Kolkata changes his attitude to life and surroundings. He finds his life becoming entangled with an ancient legend about Manasa Devi, the goddess of snakes. While visiting a temple, deep within the vast mangrove forests of Bengal, he experiences a disturbing encounter with the most feared, and revered, of Indian snakes, a king cobra. As his once-solid beliefs begin to shift, he is forced to set out on an extraordinary journey that takes him from India to Los Angeles and Venice via a tangled route through the memories and experiences of those he encounters. A flurry of coincidences and spooky interventions contribute to weaving of plot which shows how nature-nurture can be dissolved. The narrative progresses with Deen's interactions with the supporting characters like Cinta, a brilliant Venetian historian with a reverence for the mystical aspects of life. Piya, a pretty, and eminently practical, marine biologist, a loudmouth slacker/hacker named Tipu and Rafi, a desperate migrant reveal the genuine concerns for the climate change, present and past, around the world. The proposed study, mainly based on the principles and insights of ecocriticism, a field of study of literature with the help of the concepts, ideas and insights of ecology, will look into how the novelist develops within the text an underlying discourse as well as argument for the development of the awareness about the environment against the backdrop of present great concern of the people of the world relating to global warming.

Keywords : Ecology; ecocriticism; discourse; environment; climate change.

> Most people I talk to seem to defend or rationalize the pollution of water. They think you're defending fish or insects or flowers. But the effects on otters and so on are indicators of what's happening to us. It isn't a problem of looking after the birds and bees, but of how to ferry human beings through the next century. The danger is multiplied through each generation. We don't really know what bomb has already been planted in the human system. (Ted Hughes in an interview with Blake Morrison, quoted in Gifford, 86)

Ecocriticism got the status as a full-fledged literary theory with the publication of Cheryll Glotfelty and Harold Fromm's (1996) book *The Ecocriticism Reader, Landmarks in Literary Ecology* which maps the methods of ecocriticism. It is Glotfelty whose name is closely associated with ASLE formation and the

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CONTENTS

CAULDRON SCENE OF SHAKESPEARE'S *MACBETH*: A RASA-THEORETICAL STUDY

Susanta Kumar Bardhan

Introduction

So far as the history of Sanskrit poetics goes, Bharatamuni (belonging to the 3rd ventury AD) is considered to be the first art critic dealing with the different aspects of art forms such as music, dance, literary forms, etc. Bharata has propagated his theoretical issues relating to art forms and their effect on the human minds in his seminal work *Nātyaśāstra* which is recognised as the first full-fledged literary critical work in the arena of Sanskrit poetics. The ultimate effect of an art form on the audience and/or reader (called *sahridaya* meaning sympathetic/sensitive), as opined by Bharata, is *Rasa*, one of the most illustrating quintessential words in Sanskrit treasure house summing up a whole philosophy or even a civilisation, as claimed by the Indian critics. The present paper attempts to study Hecate Scene of Shakespeare's *Macbeth* from the perspective of *rasa* theory as propounded and illustrated by Bharata and other critics. For the sake of convenience of the present study we will first deal with in brief Bharata's *rasa* theory and its allied aspects/issues as developed with a view to interpreting (Sanskrit) dramaturgy in a comprehensive mummer. This discussion on theoretical issues will be followed by the analysis of Hecate Scene of *Macbeth* which is expected to show how this macabre or bivatsa scene plays a crucial role in representing dramatic effect of denouement and subsequent cathartic feelings as (to be) experienced by the spectator or reader.

Rasa-Theory' as depicted in Natyasastra

The concept of Rasa is assumed to be the most important and significant contribution of the Indian mind to aesthetics as put forward by Bharat in *Nāṭyaśāstra* and later Indian aestheticians. In the sixth chapter of the *Nātyaśāstra*, Bharata at the request of his disciples gives a thorough as well as rich description of the theory on how *rasa* is produced in (performing and literary) arts including stage-drama. He traces the root of this word to *Atharnaneda*. Sanskrit rhetoricians belonging to the schhol of *alamkāra* (poetic embellishment) like Bhāmaha, Dandin, and Vāmana use it for explaining the nature of poetry. The word *rasa* is also used in the sense of sound or noise as also for taste (*rasyate anena iiti rasah (ascdyatva)* meaning something that is relished is *rasa*).

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Relevance & impact of cārvāka philosophy in modern age

Biswajit Raj

Abstract
The history of Indian atheism is as primitive as spiritualism or idealism. At first, skepticism was found in the Vedas. The theories of Cārvāka philosophy depends on the thought of agnosticism, skepticism and atheism. According to them physical pleasure is the ultimate goal of human being. There is no place of hell, heaven, rebirth, rituals, god etc. in their philosophy. This philosophy is totally based on perception, sometimes perception based inference. It seems that, most people of modern age is living that kind of life which is full of materialistic pleasure. So, the present impact or relevance of Cārvāka philosophy in modern human thoughts should be realized. In this present research an attempt is taken to observe the impact and relevance of Cārvāka philosophy in the thoughts and life style of modern human being.

Key words: Cārvāka, pleasure, materialistic

Introduction
In Indian Philosophy, it is not possible to define a certain period of materialistic thought. Like Phoenix, it has been again and again resurrected itself and its existence has been felt through the ages. The existence and rise of materialistic thought in the vast premise of spiritualistic thought, can be compared with a revolution without any exaggeration.
We are all well acquainted with the word revolution. Revolution can emancipate society from its many impediments. This revolution is not an incoherent or parochial phenomenon. When exploitation, torture, immorality goes beyond the endurance limit, then longtime accumulately anger explodes like a canon. History proves that the exploited, humiliated, oppressed class has used revolution as the last weapon for their existence. They has participated in rebellion for their rights and freedom. We have seen how this revolution has different faces at different times, like – religious revolution, freedom revolution, language revolution, intellectual revolution. When religion becomes a weapon for fear and greed, Cārvāka objects to this immorality. Cārvāka, the rebellious voice who has risen above religious fear and greed, showed the courage to say 'no' to 'no'. Being born as a living being, they focused on fulfilling the basic needs. They propagated the need to provide food, shelter, home above everything. They do not want to force anyone to hold on their heart's desire and stomach's hunger. Those who are fighting for their existence in sweat drowned body (sometimes blood smeared body), it is not possible to them to romanticize the full moon in an empty stomach, so it is not possible to be a real spiritualistic or idealistic in empty stomach. Materialism and spiritualism fight on this plain. Spiritualism leads you to think, but it doesn't satiate your hunger, provides your foods; it talks about salvation after your life on earth; it does not advise you on earthly happiness; it advises you to refrain from earthly sensory experiences in this life to get happiness in next life. It is where the rebellious voice announces the revolution. Cārvāka is the pioneer of this revolution. Though, Budhdhists and Jainists contribute to it in a different way.

Relevance & impact of Cārvāka philosophy: Hearing the word Cārvāka a feelings arises in our mind like Sharadvata at the entrance of the palace of Dushyanta:

"Abhyaktamiva snātaḥ śuciraśucimiva prabuddha iva suptaṃ.
Baddhamiva svairagatirjanamiha sukhasṃginamavaimi." [1]

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DIGITALISATION AND ITS IMPACT ON SANTALS' ECOLOGY : A PHILOSOPHICAL OUTLOOK

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Abstract: *The Santals are one of the Adivasi communities of India. Their way of living and cultural identity is uniqueness. Their livelihood and survival is intimately linked with Nature. Their life co-exists with Nature, not in the way to dominate Nature but to have mastery over Nature so that the life, both human and non-human, can be preserved without depletion. In this way, interconnectedness with the natural environment makes their life as eco-friendly. However, slowly, due to the nationalisation of non-timber forest products, some forest goods have gained market value, and are now included in trade to earn cash money.*

In this paper, an attempt is made to understand the Santals' ecology philosophically, and how their way of life is threatened due to digitalisation. For example, many Adivasis/Tribals in Odisha, especially Santals whose subsistence depends on collection of sarjom sakam (leaf of Shorea robusta) and making plates and bowls out of them, are directly affected by GST. Further, Adivasi/Tribal communities in central India depend on tendu leaf (Diospyros melanoxylon) collection for subsistence but owing to the implementation of GST on it, their rights to these have been abrogated. In contemporary India, due to the notions of the modern development, globalisation and industrialisation through the corporate houses, the trade and infrastructure is designed to feed its personal profit interests. The consequence is that Adivasis/Tribals gets deprived. The strategy of Indian development, globalisation, and industrialisation ultimately means Adivasis/Tribals being alienated, marginalised, and oppressed. The anthropocentric conceptions of modern development and globalisation depleted the ecological balance and destroyed the traditional Adivasi/Tribal environment of holistic, integrated and elementary harmony between Nature and Culture. And such evasive actions erase/suppress the very life of indigenous group identities and knowledge networks.

Due to lack of cash during demonitisation Adivasi/Tribal daily labourers did not receive their wages on regular basis, notes of smaller amounts, in particular. They felt that banking transaction are just for the wealthy as if the amount hacked or deposited money will not get back in time. They have to spend the entire day for withdrawing money. Again, majority of their survival depend upon daily works. So, they used the new technology only for entertainment purpose. Further, modern technology changed their agriculture model as instead of using available traditional fertiliser from their locality they are using modern fertiliser these days. They are taking modern medicine in place of locally available traditional ones. Imitating the modern music and musical instruments they are avoiding their traditional style. Furthermore, advent of social media the majority of Santal youths are addicted in Face book and WhatsApp and increasing the lack of interest in work. Moreover, as modern wine has come in the market they are gradually not consuming homemade rice beer.

Key Words: *Santals, Ecology, Digitalisation, Mastery and Dominance, Modern Development.*

1. INTRODUCTION:

The Santals are one of the Adivasi communities of India with unique cultural identity. Their entire livelihood along with survival efficiency is intimately linked with Nature. The existential establishments as economical life, foods and drinks, dwellings, festivals, ceremonies, culture, religious beliefs and rituals are immensely related with Nature. Their life co-exists with Nature, not in the sense of domination but to have mastery over Nature so that the life, both human and non-human, can be preserved without depletion. The behaviour of conjunction endeavoured their relation with the natural environment makes their life eco-friendly. But, gradually, a few forest produce acquired market interest as a result of nationalisation of non-wood forest goods. Because of this change, the Santal inhabitants involved themselves in the trade system avoiding their traditional way of earning. Furthermore, in contemporary India, the need of land for development is forcing Adivasis/Tribals especially Santals for displacement. And landless Santals have been rising rapidly. As a result, in the name of development they are getting deprived.

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THE WORLD VIEW OF TRIBALS AND BAULS: A COMPARATIVE STUDY WITH SPECIAL REFERENCE TO SANTAL AND LALON FAKIR

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Abstract: *The Tribals are the Adivasi communities in India having distinctive way of living and cultural identity. On the other hand, the Bauls are mainly residing in West Bengal and Bangladesh, having their own lifestyle. Their way of life, religious beliefs and culture emerged out of their everyday life. Furthermore, their ecology and supernatural world are derived from the concrete understanding of natural environment as well as social environment, which are the essence of their existence. As a result, their society is devoid of discrimination and untouchability. For example, Santal philosophy and the philosophy of Lalon Fakir are the aggregate of hospitality, solidarity, openness to other religions, connectedness and joy in simple living celebration of life through festivities, and so on, in their own way.*

Key Words: *Tribals, Santals, Bauls, Lalon Fakir, Simple Life.*

1. INTRODUCTION:

The primitive/old inhabitants of India are known as the Adivasis. So, they are considered to be the first/original residents of the land in India. They are also known as Tribals, having native to the soil. According to the Constitution of India, Adivasis/Tribals are classified as Scheduled Tribes. They have a distinct culture and worldview of their own. They constitute a significant portion of India's total population. India is the abode of many Adivasis/Tribals, who reside in the rural locations as well as in the areas adjoining forests and mountains of the country. Their livelihood, religion, customs, and tradition have enriched the cultural landscape of India. The Santals are one of the Adivasi/Tribal communities of India belonging to the Proto-Astraloid, having a distinctive way of living and cultural identity too.

On the other hand, the Bauls live primarily in West Bengal and Bangladesh, and have their own lifestyle. Their way of life, society, and religious belief have originated from their daily life. Furthermore, their ecological and spiritual life stems from the practical perception of both the natural environment and the social climate, which are the core of their life. As a consequence, their society is non-discriminatory and is stripped of untouchability. For example, especially the Santal philosophy and the ideology of Lalon Fakir is the sum of hospitality, unity, tolerance to other faiths, communication and joy in simply celebrating life through festivities, etc. Here in this article an attempt is made for a comparative study to understand the philosophy of Adivasis/Tribals as well as philosophy of Bauls/Fakirs in general and Santals and Lalon Fakir in particular.

2. WAY OF LIFE OF ADIVASIS/TRIBALS:

The Adivasis/Tribals of India for example, the Gonds, Santals, Mundas, Hos, Uraons, Mahalis, Koras etc, have almost resembling manner of sociocultural observance that co-exist with the agricultural and natural cycle. Their feasts and festivals are the consequences of their age-old material understanding in connection with the land, water and forest. The existence and living of the Adivasi/Tribal communities rely on relating to land, forest and ecological environment. In that way, they unify their philosophy of life cycle coincides with the agricultural wheel throughout the year based on the natural phenomena.

Further, they are so dependent on forest that their whole economy runs around the forest environment. They feel more secure in the surroundings of the forest because it provides them food, shelter, drink, raw materials for building huts, basket weaving and herbal medicines, and so forth. For example, they construct their houses with several wooden logs, bamboo and branches of trees available in or near the forest. The roof of their house is sometimes thatched with a kind of locally available grass, and palm leaves. Thus, all these natural things are collected by them from or nearby forest for constructing their dwellings. Their food chart is also very much enriched with the forest products such as roots, tubers, flowers, leaves, mushrooms, honey, etc, which they collect from their immediate natural environment.

The festivals of Adivasis/Tribals are mainly seasonal and coincide with events in the agricultural cycle. Some of these festivals are: *Karama, Sarhul, Sohrai, Maghe, Phagua, Dhanbuni, Hariyari*, and so on. All these festivals of them are often interconnected with the annual agricultural cycle. For all primitive societies, festivals have had religious significance. The tradition of the Adivasis/Tribals to honour the ancestors shows clearly the role of the festivals in

Studies on Esterase and Peroxidase activity of *Lens culinaris* Medik. in relation to Stigma Receptivity

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ABSTRACT:

The current study determined the esterase and peroxidase receptivity of *Lens culinaris* Medik. an economically important pulse crop from the Fabaceae family, in order to determine the stigma receptive period and the correlation of stigma receptivity with the activity of esterase and peroxidase on the stigma surface in order to provide information for fertilization as a basis for plant breeding. It bloomed from December to February and normally opened between 18:00 and 19:00 hours. After flower opening, anthers dehisced through a longitudinal slit. A single flower produced approximately 7000 pollen grains. The stigma was wet-papilate. Nonspecific esterases and peroxidase were found in dense concentrations all over the surface of the stigmatic head and in a dispersed pattern just below the stigmatic head.

Key Words: Stigma receptivity, stigma receptivity, wet-papilate, nonspecific esterases.

INTRODUCTION:

Susceptibility to stigma can be measured by in vivo germination, esterase and peroxidase activity. Interactions between pollen and pistils play an important role in sexual reproduction in flowering plants. Pollen grain production and dispersal have biological and genetic effects on high-quality fruit and seed production.

Stigma receptivity is a key factor for successful completion of post-pollination events. Generally highest immediately after flowering, the duration of receptivity varies among species and is affected by temperature and humidity (Shivanna and Johri, 1989). The stigma generally aids in hydration and germination of pollen from its own species and closely related taxa (Heslop-Harrison, 1981).

The receptive surface of stigma contains extracellular proteins, either as membranes in dry stigma or as part of the exudates in moist stigma (Harrison and Shivanna, 1977; Heslop-Harrison, 1981; Shivanna and Johri , 1985). Esterase and peroxidase are important

The constituents of stigma surface proteins and their presence are associated with stigma sensitivity. Therefore, the stigma receptivity for *in vivo* pollen germination of *Lens culinaris* Medik.

The legume family in terms of esterase and peroxidase activity at various times after flowering is of paramount importance for the biology of sexual reproduction.

We also aimed to establish a link between esterase and peroxidase activity and susceptibility to stigma (Stone *et al*., 1995; Lavithis and Bhalla, 1995; Choudhury *et al*., 2012).

MATERIALS AND METHODS:

Stigma receptivity is an important stage in flower maturation and can significantly affect pollination rate and pollination success at different stages of the flower life cycle. Susceptibility to stigma was observed using the standard method of Joshirao and Saoji (1989). For this purpose, stigma were first fixed with alcohol acetate (1:1) and softened with 4N NaOH until the tissue was soft. They were then washed and mounted in 0.05% destained aniline blue in 0.5M NaH2PO4. The tissue was flattened with light pressure and removed for microscopic observation.

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Chakma Prominence Pattern and Catalexis

Susanta Kumar Bardhan

The phonological component of a grammar is responsible for mapping phonological input forms (underlying forms) to the correct output (surface forms).In traditional generative phonology this mapping was achieved via several phonological rewrite rules. As the output of each rule represented the input for the next rule in line, the phonological component then had several levels. Phonological rules were thus to a great extent independent from the final surface representation. Since the beginning of generative phonology, it has become clear that restrictions on the actual final output form also play some part in the phonological process. These restrictions have been formulated as well-formedness conditions. However, there has never been a clear guideline as to the division of powers between rewrite rules and well-formedness conditions, and the latter have steadily gained ground over the years. – Coetzee (1999: 99-100)

1. Introduction

In the present paper we will attempt to study the prominence pattern of Chakma, an Indo-Aryan tribal language, from the perspective of Optimality Theory (henceforth OT) developed within the broad framework of the generative paradigm by Prince & Smolensky (1993), McCarthy & Prince (1993a, b) and the theory of catalexis proposed by Kiparsky (1992) and Kager 1995). The scope of the present paper is restricted to the study of prominence pattern in Cakma non-derived words having up to trisyllables and vowel lengthening in monosyllabic words and the final heavy syllables of the tri-syllabic words. Evidently, all these aspects of our study are governed broadly by OT the fundamental tenets of which can be precisely summed in the following paragraph as stated from Elenbaas & Kager (1999: 276).

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মূল্য—পঞ্চাশ টাকা

এই সংখ্যার বিষয় সূচী

স্বাধীনতা-পূর্ব বাঙালীদের ইংরাজী কবিতা চর্চা : একটি সমীক্ষা

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সপ্তদশ শতাব্দী ও অষ্টাদশ শতাব্দীর প্রথম ভাগে ইংরেজরা ভারতে বাণিজ্য চালিয়ে গেছে এবং ১৭৫৭ সালের পলাশী যুদ্ধের পর পরই ইংরাজী ভাষা শিক্ষা বেশি করে গুরুত্ব দেওয়া শুরু করে ইস্ট ইন্ডিয়া কোম্পানী ও খ্রিস্টান মিশনারীরা। পরবর্তী কালে লর্ড বেন্টিংকের উৎসাহে মেকোলে মিনিটের প্রস্তাব অনুযায়ী (অনেকটা রাজা রামমোহন-এর নেতৃত্বে পাশ্চাত্যবাদী আন্দোলনও দায়ী) ১৮৩৫ সালে ইংরাজি মাধ্যমে শিক্ষা প্রাতিষ্ঠানিক মাত্রা যুক্ত হয় এবং এই শিক্ষার মূল লক্ষ্য ছিল ইংরেজ সরকারের তাঁবেদারি করা কেরানি উৎপাদন করা। কিন্তু ভারতীয়রা প্রতিভা ও মেধা পাশ্চাত্য শিক্ষার প্রভাবে অনেকে কেরানি না হয়ে স্বতন্ত্র ও স্বাধীন চিন্তার উন্মেষ ঘটিয়েছেন এবং সৃজনশীল সত্তার স্বাক্ষর রেখেছেন। উনবিংশ শতাব্দীর প্রথম থেকেই কলকাতা, বোম্বাই ও মাদ্রাজ শহরকে কেন্দ্র করে শিক্ষার ব্যাপক বিস্তার লাভ করে, আবার অনেকে বিদেশে পাড়ি দেন উচ্চ শিক্ষা লাভের জন্য। ইংরাজী শিক্ষায় শিক্ষিত একদল মানুষ সাহিত্য চর্চায় উৎসাহিত হয়ে ওঠেন, যার ফলস্বরূপ দেশের বড় শহরগুলিতে এবং বিলেতে থাকা ব্যক্তিবর্গ ইংরাজীতে সাহিত্য রচনায় মনোনিবেশ করেন। পর্যালোচনা করলে দেখা যাবে যে অন্যান্য ভাষায় সাহিত্যের ইতিহাসের মতোই ভারতীয়দের ইংরাজী সাহিত্য রচনার ক্ষেত্রেও শুরু হয়েছিল কবিতার হাত ধরে। এই ভারতীয় সাহিত্যের জগতে যাঁর নাম প্রথমে উল্লেখ আছে ভারতের সাহিত্য অকাডেমির ১৯৭০ সালে প্রকাশিত ও বিনায়ক কৃষ্ণ গোকক দ্বারা সম্পাদিত 'The Golden Treasury of Indo-Anglian Poetry' বইটিতে, তিনি হলেন হেনরি লুই ভিভিয়ান ডিরোজিও। যাই হোক, আমাদের বর্তমান আলোচনা বাঙালি কবিদের ইংরাজী ভাষায় লেখা কবিতা কেন্দ্রিক। আমাদের বর্তমান আলোচনাটিকে স্বাধীনতার পূর্বে লেখা কবিতার মধ্যে সীমাবদ্ধ রাখতে চাই।

বাঙালিদের ইংরাজী সাহিত্য চর্চা নিয়ে আলোচনা করতে বসে যাঁর নাম

প্রথমে আসে তিনি হলেন হেনরি লুই ভিভিয়ান ডিরোজিও (১৮০৯-১৮৩১), যদিও তিনি সেই অর্থে বাঙালি নন। কিন্তু তাঁর জন্ম ও বড় হওয়া কলকাতায় এবং শিক্ষা লাভ করেন সেখানেই। পিতা জন্মসূত্রে ভারতীয়-পর্তুগীজ এবং মা ইংরেজ। ১৮২৬ থেকে ১৮৩১ পর্যন্ত হিন্দু কলেজে শিক্ষকতা করেন এবং এই স্বল্প সময়কালে তিনি নিজেকে তাঁর ছাত্রদের ইংরাজী সাহিত্য ও পাশ্চাত্য দর্শন শিক্ষার মাধ্যমে এক প্রগতিশীল মুক্তমনা এবং দেশপ্রেমিক মানুষ গড়ার আন্তরিক চেষ্টা চালিয়ে গেছেন। তার ফলস্বরূপ এক দল 'নব্য বঙ্গ' যুবক আমাদেরকে উপহার দিয়েছিলেন। তাঁর কাব্যচর্চা অনেকাংশে ইংরেজ কবি কীটস ও বাইরন দ্বারা প্রভাবিত। তিনি দুইটি কাব্য গ্রন্থ প্রকাশ করেন সেগুলি হল Poems (১৮২৭) এবং 'The Fakeer of Jungheera : A Metrical Tale and other Poems' (১৮২৮)। নিজের ছাত্রদের প্রতি ভালোবাসা যে কতখানি তার তা প্রকাশ করেছেন 'To the Pupils of Hindu College' কবিতায়। ছাত্রদের উচ্ছলতা, বুদ্ধিদীপ্ত উদ্দাম এবং ক্ষমতা তিনি উপভোগ করেছেন আর তাই তিনি একজন আদর্শ শিক্ষক হিসাবে গর্বের সাথে ঘোষণা করেছেন : 'Weaving the chaplets you have Yet to gain,/Ah then I feel not lived in vain.' ছাত্রদেরকে উদার, সংবেদনশীল ও কর্মোদ্যোগী মনের মানুষ গড়ার উদ্দেশ্যে কবিতাকে হাতিয়ার করেছেন।

আবার তেমনি ভাবে ভারতমাতার প্রতি অকৃত্রিম প্রেম প্রকাশ করেছেন দুটি কবিতায় 'To India My Native Land' এবং 'The Harp of India' যা প্রতিটি ভারতীয়ের হৃদয় ছুঁয়ে যায়। ডিরোজিও এইভাবেই দেশপ্রেমিক কবিতার ধারা প্রতিষ্ঠিত করেছেন। ভারতের প্রকৃতি এবং সভ্যতা তিনি ভালোবেসেছেন গভীরভাবে :

> 'Of flowers still blooming on the minstrel's grave :
> Those hands are cold-but if thy notes divine
> May be by mortal wakened once again,
> Harp of my country, let me strike the strain !'
>
> (The Harp of India)

একইভাবে ভারতের সতীদাহ প্রথার ঘোরতর বিরোধী ছিলেন আর তাই এই প্রথার নগ্ন রূপটি তুলে ধরেছেন মর্মস্পর্শী দীর্ঘ কবিতামূলক 'The Fakeer of Jungheera' কবিতাটিতে। এই কবিতায় ব্রাহ্মণ কন্যা নলিনী সতীদাহ প্রথার হাত থেকে রক্ষা পেতে তার আগের প্রেমিক, ভিন্ন ধর্মের ফকীরের সঙ্গে ঘর বাঁধে। তা ক্ষণস্থায়ী হলেও শান্তি বিরাজ করে তার জীবনে। নলিনীর বাবার নিয়োজিত দস্যুদের হাতে ফকিরকে আঁকড়ে ধরে মৃত্যু বরণ করে এবং মৃত্যুহীন

বোলপুরের দুই বিস্মৃত শহিদ

পার্থশঙ্খ মজুমদার ১৫ অগস্ট ২০২১ ০৭:৪৫

ঐতিহাসিক: বোলপুর স্টেশনের স্মৃতিস্তম্ভ

কিছু বোঝার আগেই বর্ধমানের দিক থেকে একটা ট্রেন এসে থামল, বেরিয়ে এল কিছু ব্রিটিশ পুলিশ, যাদের সাজপোশাক সাধারণ পুলিশের মতো নয়। এসেই জমায়েত আন্দোলনকারীদের উপর গুলি চালাতে শুরু করল। তত ক্ষণে বোলপুর স্টেশন সম্পূর্ণ বিধ্বস্ত। উত্তেজিত জনতা ভেঙে ফেলেছেন স্টেশনের অফিসের দরজা-জানলা, কেটে ফেলেছেন টেলিফোন-টেলিগ্রাফের তার, আর স্টেশনে রাখা কয়েকশো বস্তা সরকারি চালের অনেকটাই তাদের নিয়ন্ত্রণে। গুলির শব্দে আন্দোলনকারীরা তির-ধনুক ও ইট-পাথর নিয়ে পাল্টা আক্রমণ করেন এই অন্য রকম পুলিশ বাহিনীকে। কিন্তু কিছু ক্ষণের মধ্যেই কয়েক জন গুলিবিদ্ধ হলে এই অসম লড়াই শেষ হয়। আহত সঙ্গীদের নিয়ে আন্দোলনকারীরা পালিয়ে যান।

পরে সরকারি প্রতিবেদনে লেখা হয়, ১৯৪২ সালের ২৯ অগস্ট বিকেলে তির-ধনুক, লোহার রড প্রভৃতি অস্ত্রশস্ত্র নিয়ে প্রায় পাঁচ হাজার উত্তেজিত মানুষ রাজনৈতিক স্বেচ্ছাসেবকদের নেতৃত্বে

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রবীন্দ্র দর্শনে 'আমি'র ধারণা

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Abstract:

Man is unique creation of nature. Being a social creature, he has no identity as human beings outside of society. Man has built the society as a result of mutual cooperation. Rabindranath believed that man is infinite potential Human boundaries cannot be defined. The field of creativity is where people are free Rabindranath speaks of two entities in human beings One of them is individual self and the other is Supreme self. Individual self are busy with daily worldly life. In terms of biology, man is a living being, like other animals, he has hunger and thirst. Other creatures or humans are his opponents in this case. Other animals want to share in its consumption. Here man is only a prominent being and to him the religion of the body is the religion of man. These people are enjoyable, powerful and selfish creatures. Supreme self-work of the cosmopolitan being is to inspire all people to do great deeds, the activity of creation continues in the mind of this entity. This article will discuss what is meant by individual self and supreme self-according to Rabindranath

রবীন্দ্রনাথ নিজেকে দার্শনিক মনে করতেন না, মনে করতেন কবি। কবিদের দর্শন হয় অনুভবে, তবে তাঁর লেখার মধ্যে কোথাও কোথাও দর্শনের ছোঁয়া লক্ষ্য করা যায় একথা তিনি অস্বীকার করেন নি। তিনি সচেতন ভাবেই কোন বিমূর্ত তত্ত্বকে নিয়ে আলচনা করার আগ্রহ দেখাননি। তাঁর আলচনার বিষয়-বস্তু ছিল মানুষের স্বরূপ উদ্ঘাটন করা। তাঁর বিভিন্ন রচনাতে প্রকাশিত হয়েছে মানুষের স্বরূপ, মানুষের সম্ভবনার কথা, মানুষের আত্মিক চাওয়া পাওয়ার কথা, মানুষের এই সব মৃত্যুঞ্জয়ী স্বরূপের কথা ব্যক্ত হয়েছে অন্তরের নিরিখে। রবীন্দ্রনাথ বিশ্বাস করতেন মানুষ হল অনন্ত সম্ভবনাময়। মানুষের সীমানা নির্দিষ্ট করা যায় না। মানুষ যেখানে মুক্ত সেখানেই সৃজনশীলতার ক্ষেত্র। মানুষের শক্তি প্রয়োজনের ক্ষেত্রে নিয়োযিত হয়। কিন্তু জৈবিক ক্ষেত্রে মানুষের শক্তি নিঃশেষিত হয় না এবং এর বাইরে যে শক্তি থাকে যেটা প্রয়োজনের অতিরিক্ত তাকে বলা হয় উদবৃত্ত। এই উদবৃত্ত শক্তির মাধ্যমে শিল্প, সাহিত্য সৃষ্টি হয়। কোন মানুষই পূর্ণ নয় কিন্তু মানুষের এমন প্রাচুর্য আছে যা পূর্ণতার অভিমুখী। মানুষের শিল্প, সাহিত্য, সঙ্গীত জগত হল প্রাচুর্যের জগত, লীলার জগত। এই জগত হল আনন্দের জগত। বৈচিত্র্যময় জগতকে রূপ দিয়ে হৃদয়ের জগতে পরিণত করাই হল মানুষের লক্ষ্য।

সৃষ্টিই হল রবীন্দ্রনাথের মতে মানুষের স্বভাবধর্ম, সবসময় মানুষ নিজেকে সৃষ্টি করে চলেছে। প্রয়োজন বদ্ধতা মানুষের স্বভাব নয়। মানুষ সৃষ্টি করে প্রতিনিয়তই যা প্রয়োজনকে ছাপিয়ে যায়। মানুষের মধ্যে বেঁচে থাকার ইচ্ছা প্রবল।এই ইচ্ছাটাই মানুষকে কাজ করার অনুপ্রেরণা দিয়ে থাকে। "সংসার মানুষের সত্য পরিচয়কে তুচ্ছতার আবরণ দিয়ে, অভ্যস্ততার আবরণ দিয়ে ঢেকে রাখে। এই তুচ্ছতা তার ছদ্মবেশ। প্রতিদিনের সংসারে মানুষ তুচ্ছতার ভূমিকায় ছায়ার মতো অকিঞ্চিৎকর হয়ে থাকে। এ হল মানুষের

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CONTENTS

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A Pragmatic Crtical Study of Mahesh Dattani's *Final Solutions*

Susanta Kumar Bardhan*

Abstract

Mahesh Dattani is undoubtedly one of the major dramatis in the contemporary Indian English Literature. He started composing and directing dramas in 1970s and still now he is equally engaged in the same. His major dramas are directed to criticize the contemporary socio-political and socio-cultural issues affecting India's basic life. His drama Final Solutions is one such drama concentrating on the issue of communal tension between Hindus and Muslims and exploration of ways and means to solve this which is alarmingly India's integrity. In the present study, as the title suggests, we will attempt to study this popular text mainly from point of view of semiotics and pragmatics. In course of study we will try to show how the stage properties and speeches function in the development of the action of the play and how the characters reveal their deep sense relating to communalism and grapple in the midst of that in order to find probable solution(s) to this burning crisis.

Keywords: *semiotics, pragmatics, speech acts, communalism, partition, violence, etc.*

Introduction

> The cognitive value our literary-critical practices resides not in the deliverance of truth, but in the production and attempt to give sense to these visions themselves. We might call the call sort of knowledge our critical practices gives us 'humanistic' knowledge: knowledge of how we give meaning various regions of human circumstance. - - - search for truth is a prior cultural accomplishment: the construction of varying ways of taking our world to be. -- John Gibson (2006: 449)

Mahesh Dattani (1958-) is, without doubt, an outstandingly and insightfully rich dramatist and drama-performance director in the contemporary Indian drama in English. His path-breaking plays expose the issues or problems affecting the human relations, social, moral, religious and psychological aspects of unprivileged sections of the (mostly urban) society and thereby he with his unique and novel artistic and sociological insights tries to bring out the demented/suppressed human feelings authentically as well as realistically. He uses theatre as a medium to express or manifest the bizarre being faced by man in the name of conflict between the ideals, communal tension, identity crisis, inequality, gay, sexuality, etc. affecting the very basic foundation of contemporary human society in general, Indian society in particular. We can classify the dramas of Dattani, a theatre genius marked by innovation, dynamism and diversity, into three categories namely, Stage Plays, Radio Plays and Screen Plays. He started his literary career with his *Where There's a Will* (1988) dealing with mechanics of middle class

THE TRIAL SCENE (ACT IV, SCENE I) OF *THE MERCHANT OF VENICE*: A PRAGMATIC STUDY

Susanta Kumar Bardhan

Linguistics, as we know, involves the scientific study of the constituents of language. Language manifests in the form of writing and speech or utterance for communicating messages. For the purpose of analyzing the speeches produced during the (in-)formal conversation syntax and semantics are used to meaning based on structure in isolation but the speeches in contexts generate different meaning and different shades of meaning, traced by J. L. Austin (1962), J. R. Searle (1969), H. P. Grice (1957, 1975) and G. N. Leech (1983) and others. Such study of the utterances in context from the perspective of speaker, listener and the related matters has given birth to pragmatics. The fundamental claim that the meaning of an expression or utterance should be equated with its use and its desire to transcend traditional philosophical perplexities did not fugure in the linguistic study before Austin's minute observation and analysis. No doubt, the Speech Act Theory which is the offshoot of pragmatics was first introduced by Austin (1962) in his book *How To Do Things With Words*. Austin has classified speeches/utterances into two broad categories: *Constatives* and *Performatives*. According to Austin, constative utterances are statements which describe events, process and state of affairs and these can be either true or false. On the other hand, performative utterances are those which are used for doing something by means of language. Looking into the limitation of such divisions of speeches and thereby their evaluation on the basis of truth-falsehood Austin and others have focused on the use of language in social situations. Later Searle has given a shape to the speech act theory according to which "all utterances are performatives. In issuing an utterance a speaker can perform three acts simultaneously:

1. alocutionary act: the act of using words to form sentences, those wordings making sense in a language with correct grammar and pronunciation.
2. an illocutionary act: the intended action by the speaker, the force or intention behind the words, within the framework of certain conventions.
3. aperlocutionary act: the effect that an utterance has on the thoughts, feelings, attitudes, or actions of the hearer. (Degand 2006, p. 675)

Searle (1969) goes on to clarify this idea of speech act:

> ...the semantic structure of a language may be regarded as a conventional realization of a series of sets of underlying constitutive rules, and ...speech acts are

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অভিমুখ

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—o—

সম্পাদকীয়

সার্ধদ্বিশত জন্ম বর্ষে রাজা রামমোহন রায়

নবজাগরণের পথিকৃৎ রামমোহন রায় তাঁর জন্মসাল নিয়েই বিতর্ক। ১৭৭২ সাল মতান্তরে ১৭৭৪ সালের ২২শে মে বর্ধমানের (পরে হুগলী জেলা) রাধানগর গ্রামে জন্মেছিলেন রামমোহন রায়। এ বছর উদ্‌যাপিত হচ্ছে তাঁর জন্ম সার্ধদ্বিশত বর্ষের পূর্তি। কলকাতার এশিয়াটিক সোসাইটি এ বছরই রামমোহন রায়ের ২৫০তম জন্মবার্ষিকী পালন করছে। আলোচনা সভা, তাঁর কর্মধারার মূল্যায়ন, আড়াইশ বছর পরও আজকের প্রেক্ষাপটে তাঁর প্রাসঙ্গিকতা নিয়ে নতুন নতুন বই, পত্র-পত্রিকার বিশেষ সংখ্যা প্রকাশিত হচ্ছে। অভিমুখ পত্রিকার সম্পাদকমণ্ডলী সিদ্ধান্ত নিলেন ভারত পথিক, ভারতের নবজাগরণের পথিকৃৎ, ভারতের প্রথম আধুনিক পুরুষের প্রতি শ্রদ্ধা নিবেদনে একটি সংখ্যা প্রকাশ করা তাঁদের পালনীয় কর্তব্য। আমরা আমাদের সীমিত সামর্থে চেষ্টা করেছি ২৫০ বছরের আলোকে এই যুগান্তরের পথিকের বহুমাত্রিক প্রতিভার বিভিন্ন দিক তুলে ধরতে। আজকের এই সময়ের জীবিকামুখী ব্যস্ত পাঠকের যদি ভালো লাগে তা হলে আমাদের পরিশ্রম সার্থক হবে। আলোচক, নিবন্ধকার যাঁদের লেখায় এ সংখ্যাটি সমৃদ্ধ হয়েছে তাঁদের কাছে আমরা কৃতজ্ঞতাপাশে আবদ্ধ রইলাম।

সমাজের রন্ধ্রে রন্ধ্রে কুসংস্কার, অবৈজ্ঞানিক চিন্তাভাবনা, ধর্মের প্রতি প্রশ্নহীন আনুগত্য, নারী নির্যাতনের যে অচলায়তন সেই অচলায়তন থেকে একটা সমাজকে, একটা জাতিকে মুক্ত করার সংগ্রামে রামমোহন আজীবন এক দৃপ্ত সাহসী সৈনিকের ভূমিকা পালন করেছেন। প্রাচ্য ও পাশ্চাত্য চিন্তাধারার মধ্যে সমন্বয় সাধন ছিল তাঁর কর্মধারার আলোকবর্তিকা। উনিশ শতকের নবজাগরণের সূচনাপর্বে তাঁর সর্বব্যাপী পদচারণা আমাদের বিস্মিত করে। সমাজে সমতা, ব্যক্তি স্বাধীনতা, যুক্তিবোধ ও বিজ্ঞানচেতনা এই চিন্তাধারা প্রতিষ্ঠিত করার ক্ষেত্রে রামমোহন অকুতোভয়ে সংগ্রাম চালিয়ে গেছেন।

বর্তমানে সংসদীয় গণতান্ত্রিক ব্যবস্থায় আমরা যখন আইন সভার সাংসদ-সদস্যদের আচরণে বিরক্ত, বীতশ্রদ্ধ তখন মনে হয় রামমোহন আজকের রাজনীতিবিদদের কাছে ভাষার শালীনতা, যুক্তি ও তথ্যের প্রতি নিষ্ঠা এবং দায়িত্বশীল হওয়ার বিষয়ে যা বলেছেন তা আজও প্রাসঙ্গিক। তিনি বলেছিলেন— "ব্যক্তির পরিচয় নয় প্রতিনিধিত্বের পরিচয়" কথাটি মনে রাখা জরুরী।

ব্রহ্মসংগীতের জনক রামমোহন রায়

সুশান্ত রাহা

চিন্তনে মননে কর্মে—সর্বত্রই রামমোহন এক আধুনিক মানুষ। তাঁর জন্মের সার্ধদ্বিশত বর্ষ চলছে। শিক্ষা সমাজ ধর্ম অর্থনীতি সাংবাদিকতা— রেনেসাঁসের লক্ষণ যেখানেই, সেখানেই তাঁর উপস্থিতি। রবীন্দ্রনাথের শ্রদ্ধা মূল্যায়নে রাজা রামমোহন রায় ছিলেন 'ভারতপথিক'। রামমোহনই ছিলেন বঙ্গ নবজাগরণের প্রথম মুক্ত আলো। সবদিক থেকেই *'First Liberal'* কোন আলোতে প্রাণের প্রদীপ জ্বালিয়ে তিনি বঙ্গদেশে জন্মে ছিলেন তমসার বিরুদ্ধে আজীবন লড়াই করতে তার মূল সন্ধানে আজও আমরা ব্যাপৃত।

রামমোহনের সর্বতোমুখী উদ্যম ও অধ্যবসায়কে রবীন্দ্রনাথ আমাদের জাতীয় ইতিহাসের এক অনন্য সাধারণ গর্ব বলেই মনে করেছেন। তাঁর কবিতায়—

"হে রামমোহন, আজি শতেক বৎসর করি পার
মিলিল তোমার নামে দেশের সকল নমস্কার।
মৃত্যু অন্তরাল ভেদি দাও তব অন্তহীন দান
যাহা কিছু জরাজীর্ণ তাহাতে জাগাও নব প্রাণ।
যাহা কিছু মূঢ় তাহে চিত্তের পরশমণি তব
এনে দিক উদ্বোধন, এনে দিক শক্তি অভিনব।"

ব্রহ্মসংগীত, সব দিক বিচার করলে, ব্রহ্ম সাধনার নানা স্তর ও অনুভব উপলব্ধির প্রতীক। অমূর্ত ব্রহ্ম উপাসনার আরাধনা সংগীতকে বলা হয় ব্রহ্মসংগীত। উনবিংশ শতকের প্রথম দুই দশকে বাংলায় যে ধরনের সংগীত জনপ্রিয় ছিল, সেগুলি বেশির ভাগই ছিল ঠুংরি, টপ্পা, কীর্তন ও রামপ্রসাদীর গতে বাঁধা। এছাড়া ছিল বাউল, সারি-জারি সহ অন্যান্য ধরনের লোক সংগীত। তবে এই পর্বে বাংলায় ধ্রুপদ সংগীত বলে কিছুই ছিল না। যে সব ধ্রুপদ সঙ্গীত শোনা যেত, তা সর্বত্রই ছিল হিন্দিতে। রামমোহনই বাংলায় প্রথম ধ্রুপদ সংগীত রচয়িতা। সেটা ছিল ১৮২৮।

রামমোহন যেমন ব্রাহ্মধর্ম ও ব্রাহ্ম সমাজের প্রতিষ্ঠাতা ছিলেন সেই রকম ব্রহ্মসংগীতেরও তিনি জন্মদাতা। তাঁর লেখা ও সুরে অনেক ব্রহ্মসংগীত

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জোন চেয়ারপার্সন

সুজিতকুমার কর্মকার

বিশিষ্ট সমাজসেবী লায়ন সুজিত কর্মকার সাফল্যের সঙ্গে পরপর তিনবার উত্তররামপুর জিৎপুর লায়ন্স ক্লাবের সভাপতির পদ অলঙ্কৃত করার পর এখন তিনি জোন চেয়ারপার্সনের দায়িত্বে। তার অধীনে রূপনারায়ণপুর, শতাব্দী, অরুণাঞ্জলি, চিত্তরঞ্জন স্পোর্টস প্রগতি এবং উত্তররামপুর জিৎপুর লায়ন্স ক্লাব।

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আজকের যোধন

(বর্ধমান জেলা লিটল ম্যাগাজিন সংঘের সদস্য)

অন্যতম সেরা লিটল ম্যাগাজিন

৩৯ বর্ষ, ৪র্থ সংখ্যা

জুলাই - আগস্ট, ২০২২

আষাঢ় - শ্রাবণ, ১৪২৯

সূচিপত্র

সম্পাদক— বাসুদেব মণ্ডল

সহ সম্পাদক : কালাচাঁদ ঘোষ, রমাকান্ত মণ্ডল, নমিতা ভট্টাচার্য, চিরঞ্জিত সরকার

সহযোগিতায় : প্রদীপ বন্দ্যোপাধ্যায়, উৎপলেন্দু মাল, অভিজিৎ চৌধুরী, সুব্রত হালদার, প্রশান্ত মণ্ডল, সুজিত কর্মকার, জগন্নাথ মণ্ডল, কল্পনা মিত্র, প্রদীপ পাল, বিকাশ মুখার্জি, আসরাফুন্নেসা বেগম, বিশ্বনাথ চক্রবর্তী।

প্রচ্ছদ : বিজন বিশ্বাস

মরমী নজরুল

উজ্জ্বল গঙ্গোপাধ্যায়

কাজী নজরুল ইসলাম— যাঁর একমাত্র পরিচয় 'বিদ্রোহী' কবি। পশ্চিমবঙ্গ ও বাংলাদেশ উভয়েই তাদের স্কুল কলেজের পাঠক্রমে, লেখায়, বক্তৃতায়, সেমিনারে এই 'বিদ্রোহী' পরিচয়টিকেই নজরুলের একমাত্র পরিচয় হিসাবে প্রতিষ্ঠিত করতে সক্ষম হয়েছে। কবি ও গীতিকার ছাড়া নজরুলের প্রাবন্ধিক, কথাসাহিত্যিক পরিচয় যেমন গৌণ, তেমনই রোমান্টিক কবি মরমী নজরুলের পরিচয়ও ঢাকা পড়ে গেছে তাঁর 'বিদ্রোহী' পরিচয়ের আড়ালে। নিছক আনন্দ সৃষ্টির উদ্দেশ্যে যেন তাঁর কাব্য রচিত নয়, 'চিরকেলে' বাণীও নয়, তিনি 'হুজুগের' কবি। তাঁর এই পরিচয়টাই ক্রমে দৃঢ় হয়ে যায় নাকি এই 'বিদ্রোহী' পরিচয়ের ডঙ্কায়? অথচ নজরুলের কাব্যগ্রন্থের হিসাব নিলে দেখি, তার অনেক কবিতাতেই বিদ্রোহের ছিটেফোঁটাও নেই। প্রেম, প্রকৃতি ইত্যাদির গভীর অনুভব আর পাঁচজন শ্রেষ্ঠ কবির মতোই নজরুলের কাব্যেও প্রচুর।

নজরুলের ব্যক্তি জীবনও ছিল মরমী কবি হয়ে ওঠার অনুকূল। নজরুলের জীবনী পাঠ করে কখনোই মনে হয় না তিনি প্রবল দরিদ্র ছিলেন। গ্রামের আর পাঁচটা চাষির ছেলের মতই ছিল তাঁর বাল্যকাল।[১] বেকারিতে কাজ করা বা আঠারো বছর বয়সে সৈন্য বাহিনীতে যোগদান, এ সবের পিছনে দারিদ্র নয় ছিল নজরুলের বিশেষ বোহেমিয়ান চরিত্র। আসলে নজরুল-সত্তার যে আবেগময় দিকটি তাকে ঘর ছাড়া করে, লেটোর দলে নিয়ে যায়, সহপাঠিনীর চুলের কাঁটা সংগ্রহ করায়, যুদ্ধে নিয়ে যায়, জীবনে একাধিক প্রেম ও বিবাহ আনে, সেটিই শাসন ও শোষণের বিরুদ্ধে তাঁকে বিদ্রোহী করে। তাঁর বিদ্রোহী-সত্তা আর রোম্যান্টিক-সত্তার মধ্যে আসলে কোনো বিরোধ নেই। একই প্রবাহের ভিন্নমুখী প্রকাশ। বরং তার রোম্যান্টিক চেতনাই বিশেষ পরিস্থিতিতে বিদ্রোহের জ্বালামুখীকে বিস্ফোরিত করেছে কিনা সে অনুসন্ধান আমরা করব।

হাবিলদার নজরুল কিভাবে বিদ্রোহী নজরুল এর তকমা পেলেন তার ধারাবাহিক ইতিহাস স্পষ্ট। নজরুল স্কুল জীবনে কবিতা, গান, লেটোগান লিখলেও তখন তা মুদ্রিত হয়নি। করাচি সেনা ক্যান্টনমেন্ট থেকে পাঠানো 'সওগাত' পত্রিকার ১৩২৬ জ্যৈষ্ঠ (১৯১৯ মে-জুন) সংখ্যায় প্রকাশিত 'বাউণ্ডুলের আত্মকথা' নজরুলের প্রথম প্রকাশিত রচনা। প্রথম প্রকাশিত কবিতা 'মুক্তি' ১৩২৬ শ্রাবণ সংখ্যায় 'বঙ্গীয় মুসলমান সাহিত্য পত্রিকা'য় প্রকাশিত হয়। হাবিলদারের লেখা বারোটি রচনার মাত্র চারটি হল কবিতা, তবে বিদ্রোহাত্মক কবিতা নয়। যদিও সৈনিক নজরুল তখনই ব্রিটিশের চাকরিকে 'কুকুর বৃত্তি' ভাবতে শুরু করেছেন। ১৯২০-র মার্চে সৈনিক জীবন ছেড়ে আসার পর কলকাতায়

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আজকের যোধন

(বর্ধমান জেলা লিটল ম্যাগাজিন সংঘের সদস্য)

অন্যতম সেরা লিটল ম্যাগাজিন

৩৯ বর্ষ, ৪র্থ সংখ্যা

জুলাই - আগস্ট, ২০২২

আষাঢ় - শ্রাবণ, ১৪২৯

সূচিপত্র

মরমী নজরুল

উজ্জ্বল গঙ্গোপাধ্যায়

কাজী নজরুল ইসলাম— যাঁর একমাত্র পরিচয় 'বিদ্রোহী' কবি। পশ্চিমবঙ্গ ও বাংলাদেশ উভয়েই তাদের স্কুল কলেজের পাঠক্রমে, লেখায়, বক্তৃতায়, সেমিনারে এই 'বিদ্রোহী' পরিচয়টিকেই নজরুলের একমাত্র পরিচয় হিসাবে প্রতিষ্ঠিত করতে সক্ষম হয়েছে। কবি ও গীতিকার ছাড়া নজরুলের প্রাবন্ধিক, কথাসাহিত্যিক পরিচয় যেমন গৌণ, তেমনই রোমান্টিক কবি মরমী নজরুলের পরিচয়ও ঢাকা পড়ে গেছে তাঁর 'বিদ্রোহী' পরিচয়ের আড়ালে। নিছক আনন্দ সৃষ্টির উদ্দেশ্যে যেন তাঁর কাব্য রচিত নয়, 'চিরকেলে' বাণীও নয়, তিনি 'হুজুগের' কবি। তাঁর এই পরিচয়টাই ক্রমে দৃঢ় হয়ে যায় নাকি এই 'বিদ্রোহী' পরিচয়ের ডঙ্কায়? অথচ নজরুলের কাব্যগ্রন্থের হিসাব নিলে দেখি, তার অনেক কবিতাতেই বিদ্রোহের ছিটেফোঁটাও নেই। প্রেম, প্রকৃতি ইত্যাদির গভীর অনুভব আর পাঁচজন শ্রেষ্ঠ কবির মতোই নজরুলের কাব্যেও প্রচুর।

নজরুলের ব্যক্তি জীবনও ছিল মরমী কবি হয়ে ওঠার অনুকূল। নজরুলের জীবনী পাঠ করে কখনোই মনে হয় না তিনি প্রবল দরিদ্র ছিলেন। গ্রামের আর পাঁচটা চাষির ছেলের মতই ছিল তাঁর বাল্যকাল।[১] বেকারিতে কাজ করা বা আঠারো বছর বয়সে সৈন্য বাহিনীতে যোগদান, এ সবের পিছনে দারিদ্র নয় ছিল নজরুলের বিশেষ বোহেমিয়ান চরিত্র। আসলে নজরুল-সত্তার যে আবেগময় দিকটি তাকে ঘর ছাড়া করে, লেটোর দলে নিয়ে যায়, সহপাঠিনীর চুলের কাঁটা সংগ্রহ করায়, যুদ্ধে নিয়ে যায়, জীবনে একাধিক প্রেম ও বিবাহ আনে, সেটিই শাসন ও শোষণের বিরুদ্ধে তাঁকে বিদ্রোহী করে। তাঁর বিদ্রোহী-সত্তা আর রোম্যান্টিক-সত্তার মধ্যে আসলে কোনো বিরোধ নেই। একই প্রবাহের ভিন্নমুখী প্রকাশ। বরং তার রোম্যান্টিক চেতনাই বিশেষ পরিস্থিতিতে বিদ্রোহের জ্বালামুখীকে বিস্ফোরিত করেছে কিনা সে অনুসন্ধান আমরা করব।

হাবিলদার নজরুল কিভাবে বিদ্রোহী নজরুল এর তকমা পেলেন তার ধারাবাহিক ইতিহাস স্পষ্ট। নজরুল স্কুল জীবনে কবিতা, গান, লেটোগান লিখলেও তখন তা মুদ্রিত হয়নি। করাচি সেনা ক্যান্টনমেন্ট থেকে পাঠানো 'সওগাত' পত্রিকার ১৩২৬ জ্যৈষ্ঠ (১৯১৯ মে-জুন) সংখ্যায় প্রকাশিত 'বাউণ্ডুলের আত্মকথা' নজরুলের প্রথম প্রকাশিত রচনা। প্রথম প্রকাশিত কবিতা 'মুক্তি' ১৩২৬ শ্রাবণ সংখ্যায় 'বঙ্গীয় মুসলমান সাহিত্য পত্রিকা'য় প্রকাশিত হয়। হাবিলদারের লেখা বারোটি রচনার মাত্র চারটি হল কবিতা, তবে বিদ্রোহাত্মক কবিতা নয়। যদিও সৈনিক নজরুল তখনই ব্রিটিশের চাকরিকে 'কুকুর বৃত্তি' ভাবতে শুরু করেছেন। ১৯২০-র মার্চে সৈনিক জীবন ছেড়ে আসার পর কলকাতায়

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একমুখ

একটি মননশীল প্রবন্ধ পত্রিকা

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এই সংখ্যার বিষয় সূচী

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জন্ম দ্বিশতবর্ষে শ্রদ্ধার্ঘ্য
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সুশান্ত রাহা

ভারতের নির্ভীক সাংবাদিকতার জনক হরিশচন্দ্র মুখোপাধ্যায়ের দ্বিশতবর্ষ পূর্তি উপলক্ষ্যে আমার এই শ্রদ্ধাঞ্জলি। আদি নিবাস শ্রীধরপুর বর্ধমান জেলা। কলকাতার ভবানীপুরে মাতুলালয়ে প্রতিপালিত হন। পিতা—রামধন মুখোপাধ্যায়। মাতা— রুক্মিনী দেবী। হরিশ্চন্দ্রের জন্মের ৬ মাসের মধ্যে তাঁর বাবা প্রয়াত হন। ফলে হরিশচন্দ্রের বাল্যজীবন খুবই দারিদ্র্যে কাটে। পাঠশালায় পড়ার সময় দাদা হারাণচন্দ্রের সাহায্যে তিনি ইংরেজী ভাষায় প্রাথমিক শিক্ষা পান। এর পর ৭ বছর বয়সে ভবানীপুর ইউনিয়ন স্কুলে ভরতি হন। এই স্কুল কলকাতা স্কুল সোসাইটির পরিচালনাধীন ছিল। সেই সময় সাহেব মাস্টার রেভারেন্ড পেটার্ড (Petard) বিনা বেতনে তাকে পড়ার সুযোগ করে দেন।

দারিদ্রের জন্য ভবানীপুর ইউনিয়ন স্কুল পরিত্যাগ করে চাকরির সন্ধান করেন। প্রথমে সামান্য বেতনে একটি নিলামদার কোম্পানীর অফিসে মাসিক ১০ টাকা মাইনেতে বিল লেখকের চাকরী পান। স্কুলে পড়ার সময় থেকে হরিশ্চন্দ্র লোকের নানা ধরনের দরখাস্ত লিখে বা দলিলপত্র নকল করে কিছু টাকা আয় করতেন তিনি। এখন একটা নির্দিষ্ট মাইনে হওয়ায় হরিশ্চন্দ্র ফের নিজের চেষ্টায় লেখাপড়া শুরু করেন। নিলামদার কোম্পানীতে তিনি ৬-৭ বছর কাজ করেছিলেন। অল্প টাকায় সংসার না চলায় হরিশ্চন্দ্র পরিচিত জেমস ম্যাকেন্যির চেষ্টায় মিলিটারি অডিটর জেনারেল অফিসে প্রতিযোগিতামূলক পরীক্ষায় পাশ করার পর ২৫ টাকা মাইনেতে কপি রাইটারের চাকরি পান। কাজের দক্ষতায় কপি রাইটার থেকে ১৩০ টাকা মাইনের কেরাণী পদে প্রমোশন পান। কিছুদিন পর তাঁর মাইনে হয় ২০০ টাকা। শেষ পর্যন্ত হরিশ্চন্দ্র মাসিক ৪০০ টাকা বেতনে সহকারী অডিটর পদে উন্নীত হন। মৃত্যুর সময় তিনি একজন উচ্চপদস্থ কর্মচারী ছিলেন।

রাজনৈতিক দাবি দাওয়া আদায়ের জন্য রাজা রাধাকান্তদেবের নেতৃত্বাধীন হেল্ডারস সোসাইটি ও রামগোপাল ঘোষ, প্যারিচাঁদ প্রভৃতি বুদ্ধিজীবীদের পরিচালিত ব্রিটিশ ইন্ডিয়া সোসাইটি মিলে ১৮৫১ সালের ১৪ সেপ্টেম্বর ন্যাশনাল অ্যাসোসিয়েশন

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একতুমুখ

একটি মননশীল প্রবন্ধ পত্রিকা

এবং মুখ

দশম বর্ষ • প্রথম সংখ্যা • জানুয়ারী—এপ্রিল ২০২৩

সম্পাদক
অমরেন্দ্র দত্ত

এই সংখ্যার বিষয় সূচী

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শিবরতন মিত্রের রামমোহনচর্চা

পার্থশঙ্খ মজুমদার

রামমোহন রায়ের জীবন ও কার্যকলাপের বিভিন্ন দিক নিয়ে উনিশ শতকের দ্বিতীয় ভাগ থেকে বাঙালী, ভারতীয় ও বিদেশীয় প্রাজ্ঞ গবেষকরা মূল্যবান আলোচনা করেছেন এবং এখনও করে চলেছেন। এই আলোচনার পরিমণ্ডলে শিবরতন মিত্রের রামমোহনচর্চা বিশেষ উল্লেখের দাবী রাখে। কলকাতা থেকে অনেক দূরে অবস্থিত বাংলাদেশের একটি ছোট জেলা শহরের একজন ব্যক্তি, যিনি শিক্ষাক্ষেত্রের সঙ্গে সংযুক্ত নন, রামমোহন সম্বন্ধে কী ভাবতেন তা নিঃসন্দেহে আলোচনার দাবী রাখে। মূল আলোচনায় প্রবেশের আগে শিবরতন মিত্রের জীবন ও কার্যকলাপ সম্বন্ধে সংক্ষেপে আলোচনা করা প্রয়োজন।

শিবরতনের জন্ম হয়েছিল ১২৭৮ সালের ১ চৈত্র (১৮৭২ খ্রিস্টাব্দের ১৩ মার্চ)। পিতা ঈশ্বরচন্দ্র মিত্র ছিলেন জুনিয়র বৃত্তি পরীক্ষা উত্তীর্ণ ও সিউড়ির আদালতের সাধারণ এক কর্মচারী। ১৮৯১ খ্রিস্টাব্দে বীরভূম জিলা স্কুল থেকে এন্ট্রান্স পরীক্ষায় উত্তীর্ণ হয়ে শিবরতন কলকাতার জেনারেল অ্যাসেম্বলিজ ইন্সটিটিউশনে ভর্তি হয়েছিলেন। এখান থেকে ১৮৯৪ খ্রিস্টাব্দে এফ.এ. পরীক্ষায় উত্তীর্ণ হয়ে শিবরতন এখানেই ইংরেজি বিষয়ে অনার্স নিয়ে স্নাতক (বি.এ.) পাঠক্রমে ভর্তি হয়েছিলেন। একই সঙ্গে তিনি সেই সময়ের প্রচলিত দুই বছরের লাইসেন্সিয়েট ইন ল নামের আইন পাঠক্রমেও ভর্তি হয়েছিলেন। আইন পাঠক্রম সাফল্যের সঙ্গে সমাপ্ত হলেও স্নাতক পরীক্ষায় উত্তীর্ণ হওয়া শিবরতনের পক্ষে সম্ভব হয়নি। ভাই রামরতনের অসুস্থতার কারণে চূড়ান্ত পরীক্ষার আগে তাকে সিউড়িতে দীর্ঘকাল অতিবাহিত করতে হয়েছিল, ফলে শিবরতনের পক্ষে পরীক্ষার জন্য ঠিকভাবে প্রস্তুত হওয়া সম্ভব হয়নি। ১৮৯৭ খ্রিস্টাব্দে প্রকাশিত পরীক্ষার ফলাফলে দেখা গেল ইংরেজি বিষয়ে উত্তীর্ণ হলেও সহ-বিষয়ে সংস্কৃততে মাত্র ৩ নম্বরের জন্য অনুত্তীর্ণ হয়েছেন শিবরতন। এই সময়ে রামরতন মারা যাওয়ায় শোকাহত পিতা ঈশ্বরচন্দ্র চাকরি থেকে স্বেচ্ছায় অবসর নেন। ফলে সংসার প্রতিপালনের জন্য শিবরতন জেলা কালেক্টরেটে সামান্য বেতনের কেরানির চাকরি গ্রহণ করলেন। অবশিষ্ট জীবনের প্রায় সবটাই তাঁর অতিবাহিত হয়েছিল সিউড়ি শহরে। ১৩৪৫ সালের ২০ পৌষ (১৯৩৯ খ্রিস্টাব্দের ৫ জানুয়ারি) শিবরতন এই শহরেই প্রয়াত হন।