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# QUARTERLY R&D Newsletter

Dibrugarh University

Quarterly Research and Development Newsletter

# DIBRUGARH UNIVERSITY

## Quarterly R&D Newsletter

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**This issue covers Research & Development activities of Dibrugarh University for the Period of 1st Januray-31st of March, 2022.**

# **Editorial Board**

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## Research Publications in Journals

1. N. Rajkonwar, P. Gogoi, D. Kakoti, N. Dehingia, A. Boruah, S.P. Bharadwaj, P. Dutta, *Effect of ligands PPIA and TOPO on radiative behaviour of Eu<sup>3+</sup> ions in sol-gel silica matrix*, *Journal of Luminescence*, **244** (2022) 118677.

### Abstract:

Eu<sup>3+</sup> singly doped and Eu<sup>3+</sup> co-doped with ligands PPIA and TOPO in silica matrix were fabricated via sol-gel route and investigated by structural and spectroscopic techniques. Structural studies reveal the amorphous nature of the silica matrix as well as the presence of the ligands in the matrix. Spectroscopic studies were performed through absorption, excitation, emission and time-correlated decay spectra of the fabricated samples. The phenomenological Judd-Ofelt parameters were calculated from the observed photoluminescence spectra considering the integrated intensity ratio of the allowed electric and magnetic dipole transitions. The dependence of Judd-Ofelt intensity parameters and radiative parameters of Eu<sup>3+</sup> ions on the ligands PPIA and TOPO in the studied matrix were evaluated. The radiative efficiency improved significantly with the addition of the ligands and showed the maximum for both PPIA and TOPO co-doped sample. The emission transition 5D<sub>0</sub>→7 F<sub>2</sub> observed at 616 nm wavelength of Eu<sup>3+</sup> corresponding to the red colour in the present study showed excellent radiative behaviour compared to other popular glass hosts. The study suggests PPIA and TOPO co-doped Eu<sup>3+</sup> sol-gel silica matrix as a prospective candidate for optical device applications harnessing the red emissions.

2. B.R.Kalita, P.K.Bhuyan, S.J.Nath, M.C.Choudhury, D.Chakrabarty, K.Wang, K.Hazumi, P.Supnithi, T.Komolmis, C.Y.Yatini, M.Le Huy, *The investigation on daytime conjugate hemispheric asymmetry along 100°E longitude using observations and model simulations: New insights*, *Advances in Space Research*, **69(10)** (2022).

### Abstract:

The hemispherical asymmetry of the low latitude region along 100°E±5°E is scrutinized for the year 2015 at magnetically conjugate points on seasonal and intra-seasonal time scales. Two conjugate Ionosonde station pairs are selected- one pair in the inner valley (from SEALION) and the other in the outer edges of the EIA region. The anomaly in the stations is estimated using the

difference of low latitude NmF2 from the dip equatorial NmF2 in the same meridian. A monthly average scheme is used instead of a seasonal mean, as the month-to-month variations are found to provide intricate details. The anomaly at the conjugate stations is highly asymmetric even during the equinoctial months of March and October, whereas it is nearly symmetric during April. During June/July, the morning time hemispheric asymmetry (larger on the winter side) temporarily reduces in the midday period and then reverses sign (larger in summer) in the afternoon. The NmF2 observations suggest a close relation of hemispheric symmetry to the position of the subsolar point with respect to the dip equator and a shift/expansion of the trough region of the EIA towards the summer hemisphere. The inter-hemispheric comparison of the hmF2 suggests a strong modulating influence of meridional winds at both the inner and outer stations, which depend strongly on the relative position of the subsolar point with respect to the field line geometry. Theoretical (SAMI3/SAMI2) and empirical model (IRI) simulations show a meridional movement of the EIA region with the subsolar point. The winter to summer hemisphere movement of the EIA trough and crest region is also reproduced in the GIM-TEC along 100°E for 2015. This shifting or tailoring of the trough and the crest region is attributed primarily to the meridional wind field, which varies with the shifting position of the subsolar point relative to the field line geometry. The seasonal and intra-seasonal difference in the NmF2 hemispheric asymmetry is attributed to the misalignment of the two centers of power viz., the thermospheric/neutral processes and the electromagnetic forces due to the geographic-geomagnetic offset in this longitude.

3. Parmita Phukan, Diganta Sarma, *K<sub>2</sub>CO<sub>3</sub>/PG DES promoted Transition Metal free room temperature Synthesis of nitroaldols and nitroolefins*, *Current Res. Green Sustainable Chem*, **2022**, *5*, 100259.

#### **Abstract:**

In this work, we have described the use of K<sub>2</sub>CO<sub>3</sub>/Propylene Glycol (PG) deep eutectic solvent (DES) as green and efficient alternative to volatile organic solvents for the formation of a very important reaction intermediate i.e., nitroaldols via Henry Reaction. Interestingly, the DES acted both as the solvent as well as the catalyst without the assistance of external base, solvent and additive. Further, the obtained nitroaldol product was utilized for nitroolefin synthesis.

4. Dutta, P., Borah, G. & Borkotokey, S., *Neo Arithmetic and Ranking Techniques for Trapezoidal Generalized Interval Valued Fuzzy Numbers: Their Applications in Decision Making for Medical Investigation*, *Neural Process Lett* (2022).
5. Moirangthem Tiken Singh, Borkotokey, S., Rachid Ait Maalem Lahcen, Ram N. Mohapatra, *A generic scheme for cyber security in resource constraint network, Evolutionary Intelligence using incomplete information game*, <https://doi.org/10.1007/s12065-021-00684-w>.
6. Xu Y-Q, Jin L-S, Chen Z-S, Yager RR, Špirková J, Kalina M, Borkotokey S. , *Weight Vector Generation in Multi-Criteria Decision-Making with Basic Uncertain Information*, *Mathematics*. 10 (4) : 572.
7. Mesiar, R. Kolesárová, A., Borkotokey, S., Jin, L., *Möbius product-based constructions of aggregation functions*, *Fuzzy Sets and Systems*, ISSN 0165-0114.
8. Borgohain, U., Borkotokey, S., & Deka, S., *A Coalition Formation Game for Cooperative Spectrum Sensing in Cognitive Radio Network under the Constraint of Overhead.*, *International Journal of Communication Networks and Information Security (IJCNIS)*, 13(3).
9. Borkotokey, S., Chakrabarti, S. Gilles, R.P., Gogoi, L., Kumar, R., *Probabilistic network values*, *Mathematical Social Sciences*, ISSN 0165-4896.
10. Kakoty, N., Baruah P., & Borkotokey, S., *The role of the non-productive players in cooperative games with transferable utilities: a survey*, *International Journal of General Systems*, 50:5, 527-547.
11. Dutta, Palash & Akhtari, S, *A General Amalgamate Technique to Evaluate Human Health Risk Under Uncertain Circumstances*, *Journal of Health Management*, 09720634211072596.

12. Goala, S., Prakash, D., Dutta, Palash, Talukdar, P., Verma, K. D., & Palai, G., *A decision support system for surveillance of smart cities via a novel aggregation operator on intuitionistic fuzzy sets*, **Multimedia Tools and Applications**, 1-22.

13. Gohain, B., Chutia, R., Dutta, Palash, & Gogoi, S., *Two new similarity measures for intuitionistic fuzzy sets and its various applications*, **International Journal of Intelligent Systems**.

14. Dutta, Palash, & Borah, G., *Multicriteria Group Decision Making Using a Novel Similarity Measure for Triangular Fuzzy Numbers Based on Their Newly Defined Expected Values and Variances*, **Soft Computing for Data Analytics, Classification Model, and Control** (pp. 137-151). Springer, Cham.

15. MT Singh, Borkotokey, S., *A Stable Payoff Allocation Protocol for Controlling the Selfishness and Managing the Power Consumption in Mobile Ad Hoc Networks*, **Journal of Scientific Research of Benaras University**, Volume 66, Issue 2.

**Abstract :**

We present a model to control the mobile nodes' selfish behavior in Mobile Ad Hoc Networks using the cooperative game. We design the model such that a path from a source node to a destination node is a stable coalition among the nodes. We achieve this by compensating the nodes using virtual currency to take part in the coalition formation. The incentive provided to a node taking part in the coalition is determined using the Shapley value of the coalition formed. We also design the model to use minimum power to reach the one-hop node in the communication path. We achieve each node's dynamic power control while forming the coalition among the nodes in the path from the source node to the destination node. In addition to these, we design the model where a node in the path should be truthful regarding the power requiring to reach a one-hop node. Finally, we perform a rigorous simulation to check the performance of the model.

16. Bharali A., Pegu Aditya, Buragohain J., Deka Budheswar, *Generalized ISI index of Certain Families of Nanostar Dendrimers*, **Journal of Interdisciplinary Mathematics**, 24(7), pp. 2021-2034.



17. Bharali A., Pegu Aditya, Agarwal Priyanka, Chamua Monjit, *On M-Polynomial and Some Topological Indices of Favipiravir (T-705) and Ribavirin*, **Journal of Discrete Mathematical Sciences & Cryptography**, 24(7), pp. 2121-2135.
18. Gogoi Idweep J., Chamua Monjit, Bharali A., *Computation of M-polynomial and Topological indices of Boron Kagome Lattice*, **Biointerface Research in Applied Chemistry**, 13(1), p. 59.
19. D. Dey, M. Hazarika , *Second Law Analysis of Pseudo-Plastic Nanofluid Stream past a Stretching Sheet with a Sliding Consequenc*, 51/2/2099-2113–Online publication–11/11/2021; <http://doi.org/10.1002/htj.22390>, Vol.51, No.2, 2099-2113.
20. A.S. Khound, Debasish Dey, R, Borah; *Analysis of Entropy Generation of Casson Fluid Flow Over A Stretching Surface with Second Order Velocity Slip in Presence of Radiation and Chemical Reaction*; **International Journal of Applied and Computational Mathematics**, Vol. 8, Online Publication; 04/02/2022; <http://doi.org/10.1007/s40819-022-01243-2>.
21. K. Goswami, H. P. Mondal, M.Sen and A. Sharma, *Design and analysis of all-optical Isolator Based on Linear Photonic Crystal*, **Brazilian journal of physics (Springer)**, (ISSN-1678-4448), vol.52, no.78, March-2022 (DOI: 10.1007/s13538-022-01086-8).
22. H. P. Mondal, K. Goswami, M.Sen, W. R. Khan, *Design and analysis of all-optical logic NOR gate based on linear optics*, **Optical and quantum electronics (Springer)**, (ISSN- 0306-8919), February-2022, (DOI: 10.1007/s11082-022-03624-9).
23. K. Chanda, S. Roy, H. P. Mondal, R. Bose, *To judge depression and mental illness on social media using Twitter*, **Universal Journal of Public Health**, (ISSN-2331-8880),vol-10, no-01, pp. 116-129, February-2022 (DOI: 10.13189/ujph.2022.100113).

24. S. Roy, P. Bhattacharya, I. Sarkar, H.P. Mondal and R. Bose, *A paradigm for predicting the future trends of pandemic due to corona virus after mass immunization through vaccination*, **Indian Journal of Natural Sciences, (IJONS), (ISSN-0976-0997), vol-12, issue-70, February-2022.**

25. A. Sharma, K. Goswami, H. P. Mondal, T, Datta, M.Sen, *A review on photonic crystal based all-optical logic decoder: Linear and Nonlinear perspectives*, **Optical and quantum electronics (Springer), (ISSN-0306-8919), Vol. 54, January-2022, (DOI: 10.1007/s11082-021-03473-y).**

26. Maitreyee Sharma, *Spontaneous Abortion and its Association with Socioeconomic Status: Evidence from the Mishing Tribal Women*, **Bulletin of the Department of Anthropology: Dibrugarh University, vol 49.**

#### **Abstract :**

India is still far behind achieving Millennium Development Goals which aim at improving child survival and maternal health. According to UNICEF about 800 women die every day of preventable causes related to childbirth and pregnancy. Still birth, induced abortion and miscarriages can be suggested a public health concern in India. Spontaneous abortion is defined as early pregnancy loss before 20th weeks of gestation, or 139 days, counting from the first day of the last normal menses. Participants who were not certain or not have recalled details and times of miscarriage that occurred were excluded from the survey. Mishing village is situated in Jengraimukh sub-division of Majuli. 242 participants falling in the age range of 43-67 years who had completed their fertility were approached for data collection. Data were analyzed with the help of SPSS software (14.0 versions) and a p-value of  $< 0.05$  was considered statistically significant. Crude Odds ratios (adjusted for regular local beer consumption and contraception) at 95% confidence interval (95% CI) were used. A significant lower risk was observed among the HIG participants in the adjusted model. A decreasing risk of occurrence of spontaneous abortion along with the increasing level of education was clearly apparent. Regarding the effects of occupational status of the participants, risk was found to be lowest in middle professionals and reduced in participants engaged in petty business and other low-skilled activities. After adjusting for confounders, the risk was even lowered significantly among the middle professionals.

27. Kalyani Pathak, Ratna Jyoti Das, Neelutpal Gogoi, Riya Saikia, Himangshu Sarma, Aparoop Das, *A validated high-performance thin-layer chromatography method for the simultaneous determination of quercetin and gallic acid in *Annona reticulata* L.*, *JPC– Journal of Planar Chromatography – Modern TLC*. vol. 35, no. 1, pp. 1-7, 2022(February).

**Abstract :**

A sensitive and reliable high-performance thin-layer chromatography (HPTLC) method has been developed to simultaneously estimate quercetin and gallic acid in *Annona reticulata* L. The methanolic extract of the leaf of *A. reticulata* L. was performed to detect standard marker compounds like quercetin and gallic acid by the automatic TLC applicator. The plate was developed using toluene–ethyl acetate–formic acid (9:10:1.6, V/V) as the mobile phase, and detection was performed by densitometric scanning at 254 nm. The system was found to give well-resolved bands for quercetin (standard) at  $R_F = 0.71$  and gallic acid (standard) at  $R_F = 0.63$  from other constituents present in the leaf extract of *A. reticulata* L. The spectral analysis of standard gallic acid and sample in the HPTLC study confirmed the presence of gallic acid in the plant extract. The average recovery of quercetin and gallic acid was found close to 99%, suggesting the accurateness of the method. The proposed validated HPTLC method offers a new, sensitive, specific method for the quantification of quercetin and gallic acid in *A. reticulata* L. The presence of the phytochemicals like quercetin and gallic acid in the leaves of *A. reticulata* L. supports the view that the leaves could be a potential source of natural antioxidant, anti-inflammatory, and antidiabetic drugs.

28. Kalyani Pathak, Ratna Jyoti Das, Riya Saikia, Aparoop Das and Mohammad Zaki Ahmad, *Bora Rice: Natural Polymer for Drug Delivery*, *Materials Proceedings*. vol. 7, no. 1, pp. 1-6, 2022.

**Abstract :**

Natural polymers play a vital part in the formulation of pharmaceutical dosage forms due to their use as excipients. Synthetic polymers have been introduced into drug delivery recently; the usage of natural polymers in drug delivery research continues to rise. It is not surprising that applications other than its caloric value have been found for starch. Various natural sources of the polymer have been investigated for delivery systems; among them, *Assam Bora rice* starch seems to be a promising candidate due to its interesting properties such as being non-toxic, biocompatible, biodegradable, mucoadhesive, and non-immunogenic. *Assam Bora rice*, locally known as *Bora Chaul*, was first introduced in Assam, India, from Thailand or Myanmar by Thai-Ahom, now widely cultivated throughout the Assam. The starch obtained from *Assam Bora rice* is characterized by its high amylopectin content (i.e., >95%) with a branched, waxy polymer which shows physical stability and resistance towards enzymatic action. *Assam Bora rice* starch hydrates and swells in cold water, forming viscous colloidal dispersion or sols responsible for its bioadhesive nature. Moreover, it is degraded by colonic bacteria but remains undigested in the upper GIT. Due to the excellent adhesion and gelling capability, it is often selected as a

mucoadhesive matrix in a controlled release drug delivery system. Carboxymethyl *Assam Bora rice* starch has also been applied for SPIONs stabilization and, further, it can effectively bind and load cationic anti-cancer drug molecule, Doxorubicin hydrochloride (DOX), via electrostatic interaction. This article provides a critical assessment of *Assam Bora rice* literature and shows how the rice can be used in many ways, from food additives to drug delivery systems.

**29.** Kalyani Pathak, Manash Protim Pathak , Riya Saikia, Urvashee Gogoi, Jon Jyoti Saharia , James H Zothantluanga, Abhishek Samanta and Aparoop Das, *Cancer Chemotherapy via Natural Bioactive Compounds, Materials Proceedings. vol. 7, no. 1, pp. 1-6, 2022.*

#### **Abstract :**

**Background:** Cancer-induced mortality is increasingly prevalent globally which skyrocketed the necessity to discover new/novel safe and effective anticancer drugs. Cancer is characterized by the continuous multiplication of cells in the human which is unable to control. Scientific research is drawing its attention towards naturally-derived bioactive compounds as they have fewer side effects compared to the current synthetic drugs used for chemotherapy.

**Objective:** Drugs isolated from natural sources and their role in the manipulation of epigenetic markers in cancer are discussed briefly in this review article.

**Methods:** With advancing medicinal plant biotechnology and microbiology in the past century, several anticancer phytochemicals were developed. Modern pharmacopeia contains at least 25% herbal-based remedy including clinically used anticancer drugs. These drugs mainly include the podophyllotoxin derivatives vinca alkaloids, curcumin, mistletoe plant extracts, taxanes, camptothecin, combretastatin, and others including colchicine, artesunate, homoharringtonine, ellipticine, roscovitine, maytansin, taspargin, and bruceantin.

**Results:** Compounds (psammalin, didemnin, dolastin, ecteinascidin, and halichondrin) isolated from marine sources and animals such as microalgae, cyanobacteria, heterotrophic bacteria, invertebrates. They have been evaluated for their anticancer activity on cells and experimental animal models and used chemotherapy. Drug induced manipulation of epigenetic markers plays an important role in the treatment of cancer.

**Conclusion:** The development of a new drug from isolated bioactive compounds of plant sources has been a feasible way to lower the toxicity and increase their effectiveness against cancer. Potential anticancer therapeutic leads obtained from various ethnomedicinal plants, foods, marine, and microorganisms are showing effective yet realistically safe pharmacological activity. This review will highlight important plant-based bioactive compounds like curcumin, stilbenes, terpenes, other polyphenolic phyto-compounds, and structurally related families that are used to prevent/ameliorate cancer. However, a contribution from all possible fields of science is still a prerequisite for discovering safe and effective anticancer drugs.

30. Manjir Sarma Kataki, Bibhuti B Kakoti, *An Optimized Herbal Formula Reverses the Hepatotoxicity Induced by Acetaminophen*, *Journal of Young Pharmacists*, 2022; 14(1):56-61.

**Abstract:**

**Objectives:** In this present study the hepatoprotective effect of an optimized herbal formula (HF) was appraised against paracetamol induced liver damage in rats. **Methods:** *In vitro* antioxidant activity of the HF was evaluated by ABTS radical scavenging assay. The hepatoprotective activity of HF (100, 200 and 400 mg/kg b.w) was assessed against paracetamol induced liver damage in rats. Serum enzymatic levels of serum glutamate oxaloacetate transaminase (AST), serum glutamate pyruvate transaminase (ALT), serum alkaline phosphatase (ALP) and Gamma-glutamyltransferase ( $\gamma$ -GT) were appraised along with estimation of catalase (CAT), superoxide dismutase (SOD), Glutathione (GSH) and TBARS levels in liver tissues. Lipid profile was also examined. Furthermore, histopathological examination of the liver sections was performed to approve and advocate the induction of hepatotoxicity as well as hepatoprotective effectiveness. **Results:** The HF showed robust *in vitro* antioxidant activities in terms of ABTS radical scavenging. HF reinstated the significantly raised serum enzymatic levels of AST, ALT, ALP and  $\gamma$ -GT in a dose dependent manner. The lipid profile was also found to be stabilized. The histopathological remarks did further establish the biochemical indications of hepatoprotection. Elevated level of catalase (CAT), superoxide dismutase (SOD), Glutathione (GSH) and reduced TBARS levels in liver tissues further reinforce the hepatoprotective actions. **Conclusion:** The outcomes evidently unveil the antioxidant efficacy and hepatoprotective activity of HF against paracetamol induced liver damage in rats.

31. Ali F, Alom S, Shakya A, Ghosh SK, Singh UP, Bhat HR, *Implication of in-silico studies in Search of Novel Inhibitors Against SARS-CoV-2*, *Archiv der Pharmazie*. e2100360. doi: 10.1002/ardp.202100360.

32. Hazarika H, Krishnatreyya H, Tayagi V, Islam J, Gogoi N, Goyary D, Chhattapadhya P, & Zaman K., *The fabrication and assessment of mosquito repellent cream for outdoor protection*, *Scientific Reports*, 12: 2180 (2022). ISSN: 2045-2322.

**Abstract :**

Mosquito-borne infections like dengue, malaria, chikungunya, etc. are a nuisance and can cause profound discomfort to people. Due to the objectional side effects and toxicity associated with synthetic pyrethroids, *N,N*-diethyl-3-methylbenzamide (DEET), *N,N*-diethyl phenylacetamide (DEPA), and *N,N*-di ethyl benzamide (DEBA) based mosquito repellent products, we developed an essential oil (EO) based mosquito repellent cream (EO-MRC) using clove, citronella and lemongrass oil. Subsequently, a formulation characterization, bio-efficacy, and safety study of

EO-MRC were carried out. Expression of Anti-OBP2A and TRPV1 proteins on mosquito head parts were studied by western blotting. In-silico screening was also conducted for the specific proteins. An FT-IR study confirmed the chemical compatibility of the EOs and excipients used in EO-MRC. The thermal behaviour of the best EOs and their mixture was characterized by thermogravimetric analysis (TGA). GC-MS examination revealed various chemical components present in EOs. Efficacy of EO-MRC was correlated with 12% *N,N*-diethyl benzamide (DEBA) based marketed cream (DBMC). Complete protection time (CPT) of EO-MRC was determined as 228 min. Cytotoxicity study on L-132 cell line confirmed the non-toxic nature of EO-MRC upon inhalation. Acute dermal irritation study, acute dermal dose toxicity study, and acute eye irritation study revealed the non-toxic nature of EO-MRC. Non-target toxicity study on *Danio rerio* confirmed EO-MRC as safer for aquatic non-target animals. A decrease in the concentration of acetylcholinesterase (AChE) was observed in transfluthrin (TNSF) exposed Wistar rats. While EO-MRC did not alter the AChE concentrations in the exposed animals. Results from western blotting confirmed that Anti-OBP2A and TRPV1 proteins were inhibited in TNSF exposed mosquitoes. Mosquitoes exposed to EO-MRC showed a similar expression pattern for Anti-OBP2A and TRPV1 as the control group. In silico study revealed eight identified compounds of the EOs play significant roles in the overall repellency property of the developed product. The study emphasizes the mosquito repellent activity of EO-MRC, which could be an effective, eco-friendly, and safer alternative to the existing synthetic repellents for personal protection against mosquitoes during field conditions.

**33.** Junejo J A, Zaman K and Rudrapal M., *Hepatoprotective and Anti-inflammatory Activities of Hydro-alcoholic Extract of Oxalis debilis Kunth. Leaves*, *Letters in Applied Nanobioscience*, (2022), 11(03): 3626 – 3633 .

#### **Abstract :**

This study aimed to investigate hepatoprotective and anti-inflammatory activities of the hydro-alcoholic extract of *Oxalis debilis* (ODHE) leaves. Acute oral toxicity evaluated ODHE in graded oral doses (100, 500, 1000, 3000, and 5000 mg/kg body weight) in rats. The hepatoprotective activity was evaluated in CCl<sub>4</sub> intoxicated rats at 200 and 400 mg/kg body weight doses of ODHE, while anti-inflammatory activity was determined by carrageenan-induced paw edema in rats at 200, 400, 800 mg/kg body weight doses of ODHE. The ODHE was safe at the highest dose of 5000 mg/kg in experimental rats. In hepatoprotective activity, ODHE significantly reduced the serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), and total bilirubin (TB) levels as compared to the CCl<sub>4</sub> control group. On the other hand, ODHE showed an anti-inflammatory effect similar to that of the control group in the carrageenan-induced paw edema model. The histopathological findings showed a significant difference between the ODHE (400 mg/kg) and CCl<sub>4</sub> groups. The present experiment showed that ODHE has significant hepatoprotective and anti-inflammatory activities. Results confirm the use of *O. debilis* in folk medicine in the treatment of hepatotoxicity and inflammation.

34. Junejo J A, Zaman K, Rudrapal M, Celik I, Attah E I., *Antidiabetic bioactive compounds from Tetrastigma angustifolia (Roxb.) Deb and Oxalis debilis Kunth.: Validation of ethnomedicinal claim by in vitro and in silico studies. South African Journal of Botany 143:164 – 175 . ISSN: 0254 – 6299.*

#### **Abstract :**

Tetrastigma angustifolia (Roxb.) Deb is an evergreen shrub belonging to the family Vitaceae. This plant species has been used for thousand years in Ayurvedic medicine. Ethnomedicinal study also documents the use of T. angustifolia leaves in the management of diabetes. On the other hand, Oxalis debilis Kunth. is a tristylous plant commonly known as pink woodsorrel belong to the family Oxalidaceae. This plant has been used traditionally for the treatment of dysentery and diarrhea. Ethnobotanical study also reports the use of leaf decoction of O. debilis in the treatment of diabetes. In our earlier work, the antidiabetic activity of hydro-alcoholic leaf extracts of T. angustifolia and O. debilis have been reported. In spite of ethnomedicinal implications and several scientific studies in the recent past, phytochemical investigations in support of the antidiabetic potential of these plant species are yet to be explored. Therefore, the present study was aimed at the isolation of bioactive phytoconstituents as antidiabetic principle(s) from T. angustifolia and O. debilis leaves. In this paper, two bioactive compounds, namely apigenin derivative (AGD) and stigmasterol (STM) were isolated from the methanolic leaf extracts of T. angustifolia and O. debilis, respectively by column chromatographic technique. The structures of the isolated compounds were established by spectroscopic/spectrometric techniques including FT-IR, <sup>1</sup>H NMR and <sup>13</sup>C NMR and Mass. The isolated flavonoids were identified as 8-hydroxyapigenin 7-O-b-D-glucopyranoside, a derivative of apigenin (AGD) and stigmasta-5,22-dien-3b-ol i.e., stigmasterol (STM). The antidiabetic potential of AGD and STM was evaluated by in vitro α-glucosidase and α-amylase inhibitory assays. To validate the antidiabetic efficacy, molecular docking and dynamics studies were performed using AutoDock Vina and GROMACS software. In vitro assays revealed the antidiabetic potential of AGD and STM with α-glucosidase and α-amylase inhibitory activities. From docking and MD simulation studies, promising binding affinity of AGD and STM for human lysosomal α-glucosidase (5NN8) and human pancreatic α-amylase enzymes (1B2Y) with favorable binding modes, stable protein-ligand complexes and well defined protein-ligand interactions were observed. Based on in vitro and in silico studies, our study reports the antidiabetic potential of the isolated apigenin derivative, AGD (a new flavonoid molecule) and stigmasterol, STM (an existing plant sterol) with α-glucosidase and α-amylase inhibitory activities. However, the flavonoid molecule, AGD possesses better antidiabetic profile than the steroid molecule, STM particularly against human α-amylase enzyme. Our present investigation successfully validates the traditional as well as ethnomedicinal claims of T. angustifolia and O. debilis as antidiabetic medicines.

35. Binita Pathak, Ankita Khataniar, Barlin Das, Sristisri Upadhyaya, Ankita Medhi, P K Bhuyan, A K Buragohain, and Debajit Borah, *Spatio-temporal diversity of biological aerosols over Northeast India: a metagenomic approach, Environmental Science and Pollution Research, <https://doi.org/10.1007/s11356-022-20323-w>.*

## **Conference Papers**

1. K. Chanda, S. Mitra, S. Roy, R. Bose, H.P. Mondal, , *Females' usage of social media to cope with stress and depression*, 2nd International Conference on on the Emerging Technologies in Computing (ICETE-2022), Brainware University, Kolkata, February-2022.

2. S. Roy, S. Chakraborty, R Bose, H.P. Mondal and S. Biswas, *Judgment Phase of Lockdown due to the third wave in India during COVID-19*, 2nd International Conference on on the Emerging Technologies in Computing (ICETE-2022), Brainware University, Kolkata, February-2022.

3. Maitreyee Sharma, *Factors associated with Age at Natural Menopause: Evidence from Mishing Tribal Women of Assam in North East India*, Indian Anthropology Congress -2022, 21-23 February, 2022 Organized by Department of Anthropology, University of Hyderabad in collaboration with Indian National Confederation and Academy of Anthropologists (in blended mode).

### **Abstract:**

To investigate the socio-demographic, lifestyle, dietary and reproductive risk factors associated with early and late age at natural menopause among the Mishing tribal women of Upper Assam, North-East India. Data on socio-demographic, lifestyle, dietary and reproductive characteristics of postmenopausal women were collected by using a pre-structured open ended interview schedule. Multinomial logistic regression-significant adjusted odds ratios of characteristics and their association with age at natural menopause were examined. The mean age at natural menopause was found to be  $48.44 \pm 0.10$  years. Women with the highest education attained showed a 5.11 times higher risk of attaining menopausal age later. Underweight and never-married women were more likely to experience early menopausal onset. Women who enter into marriage before the age of 25 are more likely to experience menopause early. A positive association of the consumption of fresh and fermented fish or meat with late age at menopausal onset has also been observed.



## Published Books

1. Dr. Sudarshana Borah, Dr. Bibhuti B Kakoti, Dr. Priyanka Shankarishan, *CALAMUS LEPTOSPADIX: AN ETHNOMEDICINAL ANTIDIABETIC PLANT OF ASSAM*, Publisher: Paperback, 1 January 2022.

2. S. Borkotokey, R. Kumar, D. Mukherjee, KS Mallikarjun Rao, S. Sarangi, (Editors), *Game Theory and Networks: New Perspectives and Directions*, ISBN 978-93-91064-00-6, Springer Singapore, 2022.

## Published Book Chapters

1. Roktopol Hazarika, Bidyutjyoti Dutta and Diganta Sarma, *Nanocatalysis in Aryl Carbon-Hetero Atom Coupling Reactions: Special Emphasis on Copper Free Protocols*, In: *Advanced Nanocatalysis for Organic Syntheses and Electroanalyses, 2022, 44-59*, Editors : Vijai K. Rai, Manorama Singh, Ankita Rai, Publisher : Bentham Science Publishers Pte. Ltd. Singapore, ISBN (Online): 978-981-5040-16-6, ISBN (Print): 978-981-5040-17-3, ISBN (Paperback): 978-981-5040-18-0.

2. Priyanka Gogoi, Diganta Sarma, Kalyanjyoti Deori. , *Oxidation Reactions Using Nanomaterials as Heterogeneous Catalyst*, In: *Advanced Nanocatalysis for Organic Syntheses and Electroanalyses, 2022, 80-95*, Editors : Vijai K. Rai, Manorama Singh, Ankita Rai, Publisher: Bentham Science Publishers Pte. Ltd. Singapore, ISBN (Online): 978-981-5040-16-6, ISBN (Print): 978-981-5040-17-3, ISBN (Paperback): 978-981-5040-18-0.

3. Jasmin Sultana and Diganta Sarma, *Graphene-Based Nano-materials as Catalyst for the Synthesis of Medicinally Important Scaffold 1,2,3-triazole*, In: Graphene-based Nano-material Catalysis, 2022, 78-96, Editors: Manorama Singh, Vijai K Rai, Ankita Rai, Publisher: Bentham Science Pte. Ltd. Singapore, ISBN: 978-981-5040-49-4.
4. Manjir Sarma Katak, Bibhuti B Kakoti, Kangkan Deka, Ananya Rajkumari, *Nanotechnology Applications in Natural Nanoclays Production and Application for Better Sustainability*, In: Sustainable Nanotechnology, Published by John Wiley & Sons Inc. USA. DOI: 10.1002/9781119650294.ch10.
5. Bibhuti B. Kakoti, Kangkan Deka, Manjir Sarma Katak. , *Role of Eco-friendly Nanotechnology for Green and Clean Technology*, In: Sustainable Nanotechnology, Published by John Wiley & Sons Inc. USA. DOI: 10.1002/9781119650294.ch14.
6. Goala S., Borkotokey S, *The Efficient, Symmetric and Linear Values for Cooperative Games and Their Characterizations*, In: Borkotokey S., Kumar R., Mukherjee D., Rao K.S.M., Sarangi S. (eds) Game Theory and Networks. Indian Statistical Institute Series. Springer, Singapore. [https://doi.org/10.1007/978-981-16-4737-6\\_7](https://doi.org/10.1007/978-981-16-4737-6_7).
7. Dr. Nisha Gohain, *Genetic Code from a Quotient Group Structure*, In: Current Topics in Mathematics, 2022, 68-77.

## **Research Grants / Projects**

**1.. Project Title:** A Study of Randić Matrix and ABC Matrix of Graph.

**PI:** Dr. Ankur Bharali.

**Funding Agency:** Science and Engineering Research Board (SERB).

**Duration of scheme:** 36 months.

**Amount:** Rs 18.30 Lakhs

**2.. Project Title:** Chemistry-Climate interaction and possible impacts of climate change on the hydrological cycle and agricultural productivity over the Eastern-Himalayan Foothills Region.

**PI:** Dr. Binita Pathak

**Funding Agency:** DST-SERB, as part of SERB WOMEN EXCELLENCE AWARD-2022

**Duration of scheme:** 36 months.

**Amount:** Rs 18 Lakh.

## **Patents**

**1. Patent Type:** Australian Innovation Patent

**Invention title:** A process for reducing power consumption using different floor layouts of data center.

**Inventor(s):** S. Mukherjee, R. Bose, S. Roy, D. Sarddar and H.P. Mondal.

**Patent Grant Details :** Grant no. 2021103019, 19th January-2022 .

## Conferences/ Workshops Hosted

1. One Day Symposium on: *Publication Skill Development Programme* for Research Scholars of Dibrugarh University was organized jointly by the **Department of Pharmaceutical Sciences and IQAC, Dibrugarh University, Date: January 29, (Saturday) 2022.**

**Co-Ordinator:** Dr.Bibhuti B Kakoti.

**No. of participants:** 59.

## Awards and Recognitions received by Faculty Members

1. **Dr Binita Pathak** from the Department of Physics, Dibrugarh University, was honored with *SERB –Women Excellence Award, 2022* by **Science and Engineering Board (SERB), a statutory body of DST, Govt. of India.**
2. **Dr Ankur Bharali** from the Department of Mathematics, Dibrugarh University, was awarded *Teachers Associateship for Research Excellence* by **SERB-DST.**

## Awards and Recognitions received by research scholars

1. **Dr. Nibedita Dehingia**, a PhD Scholar in the Department of Physics, has been awarded PhD degree by Dibrugarh University on 1<sup>st</sup> April, 2022. She was working under the supervision of Dr Pankaj Dutta, Associate Professor, Department of Physics.
2. **Akash Buragohain**, Research Scholar, Department of Physics, was awarded the **Best Poster award** in the **INUP-i2i Familiarization Workshop on Nano & Bio Materials and Devices**, held at **Centre for Nanotechnology, IIT Guwahati** during 1<sup>st</sup> - 3<sup>rd</sup> march, 2022. The topic of his poster was *CSRR based microwave sensor for dielectric measurement of liquids.*

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## Research Publications in Journals

1. Goswami, T. K.; Gogoi, M.; Mahanta, B. N.; Mukherjee, S.; Saikia, H.; Shaikh, M. A., Kalita, P.; Baral, U.; Sarmah, R. K., *Brittle tectonics in the western Arunachal Himalayan frontalfold belt, northeast India: Change in stress regime from pre-collisional extension to collisional compression*, 19 January, 2022. *Geological Journal*.

### Abstract:

The study of brittle deformation of the collisional mountains can explain its shallow crustal tectonic evolution and the palaeostress regime. The Main Boundary Thrust (MBT) zone in the western Arunachal Himalaya displays imbrication in the Permian Gondwana sequence between the MBT-1 (/Bome Thrust/MBT-Upper) in the north and MBT-2 (/MBT-Lower) in the south with consistent northerly dip. The Lower Gondwana rocks occur in the footwall of the MBT-1 with the Proterozoic Bomdila Group in the hangingwall. The upper Gondwana rocks constitute the hangingwall sequence for the MBT-2 with Neogene Siwalik rocks in the footwall. This article analyses palaeostress using brittle fractures in the Gondwana rocks that crop out for ~120 km<sup>2</sup> in the study area. The fault-bounded imbricate zone depicts eight brittle shear indicators and four sets of joints (J1 and J2: inclined and J3 and J4: subvertical). The signatures of the inherited pre-Himalayan extensional deformation are preserved in the Lower Gondwana Miri Formation. The Bichom and Bhareli rocks exhibit brittle deformation features of the Himalayan Orogeny under strong ~N-S compression. The palaeostress analysis of all joint sets indicates three phases of brittle deformation in the Gondwana and Siwalik rocks of the area. The subvertical joint sets and normal faults in the Miri Formation indicate a north-northwest (NNW)-directed extensional phase of the pre-Himalayan origin. The inclined joint sets of the Bichom and Bhareli formations of the Gondwana sequence depict Himalayan orogeny with ~N-S compressional phases. The third phase of brittle deformation in the Siwalik sequence depicts an east-west (~E-W) extension. The arc-parallel extension in the frontal fold belt of the Arunachal Himalaya may be due to oblique India-Asia collisional tectonics.

2. Kalita, P.; Phukon, P.; Goswami, T. K.; Imayama, T.; Srivastava, H. B., *Chemical mass transport during deformation and metamorphism: Insights from the Main Central Thrusts and its foot wall of Western Arunachal Himalaya, NE India*, 2. February 2022. *Lithos, ELSEVIER*, 416–417 (2022) 106641.

**Abstract:**

The Main Central Thrust (MCT) is one of the major tectonic discontinuities stretching about ~2500 km along the length of the Himalaya and it plays important role during the tectono-metamorphic evolution of Himalayan orogen. This contribution aims to find out the element mobility and loss or gain of chemical mass during mylonitization and migmatization of rocks and their relation with deformation and metamorphism within the Main Central Thrust Zone (MCTz) and its immediate footwall along the Bomdila-Dirang-Seppar section of the Western Arunachal Himalaya, India. Based on meso- and microstructural observations, we divided the Dirang Formation in the footwall of the MCT into 3 units: Lower Mylonite Zone (LMZ), Protomylonite Zone (PMZ) and Upper Mylonite Zone (UMZ), with increasing structural distance from Dirang thrust towards NW. Deformation of the Dirang Formation results in enrichment of Na, K and Si with significant gain in mass of ~55% in the UMZ relative to the PMZ. We inferred that shear strain localization during mylonitization in the UMZ induces textural transitions causing chemical alterations at peak metamorphism conditions of 0.62–0.66 GPa and 690°-710 °C. Migmatites of Lower Structural Position (LSP) show enrichment of Si, Na, K, Ca, Mn and P with depletion of Mg and Fe in the leucosome + mafic selvage (LM) relative to the paleosome with ~13% chemical mass gain. On the other hand, migmatites of Upper Structural Position (USP) are characterized by enrichment of Si, Mn and K and depletion of Ca, Mg, Na, P and Fe in the LM relative to the paleosome with ~17% chemical mass gain. Such chemical changes occur during near peak metamorphic conditions of 0.52–0.63 GPa and 680°-720 °C and it is accompanied by the appearance of sillimanite. This study improves our understanding of the chemical modification of rocks in the MCT and its footwall, which were subjected to deformation and metamorphism during its evolution in Himalayan orogen. The emplacement of the GHS along the MCT buried the Dirang Formation to a depth of ~23–25 km. Interaction of fluids, derived from dewatering of the underthrust Dirang Formation, induced chemical alteration in the UMZ. We interpret that chemical mass transfer in migmatite zones directly

influences the metamorphic reactions that occur during deformation and crustal anatexis in intracontinental shear zones, such as the MCT.

**3. Borgohain, K.; Sarmah, R. K., *Petrography and whole - rock geochemistry of the Miocene Bhuban Formation of Tripura Fold Belt, North District, Tripura, India: implications for provenance, tectonic setting and weathering intensity*, 3. February 2022, Journal of Sedimentary Environments.**

**Abstract:**

Petrography and whole-rock geochemical analysis of the Miocene Bhuban Formation exposed in the Jampui Anticline of Tripura Fold Belt, Tripura, India was carried out to reveal the provenance, depositional environments, tectonic setting and intensity of paleo-weathering of the source rocks at that period is described in this work. The Bhuban sandstones have an average detrital framework composition of Q<sub>(92.51%)</sub>, F<sub>(4.44%)</sub> and RF<sub>(3.05%)</sub>. The sandstones are mostly composed of quartz arenite and subarkose with subordinate sublithic arenite and their bulk-rock geochemistry support the petrographic results. The provenance discrimination diagrams depict the derivation of the detritus from both plutonic and metamorphic source rocks having affinity of continental block provenance with a minor trace of the recycled source. The sandstones have moderate SiO<sub>2</sub> contents (61.38–70.85%; average 64.04%), constitute the major portion of the oxides followed by Al<sub>2</sub>O<sub>3</sub> (12.42–18.35 wt%) and Fe<sub>2</sub>O<sub>3</sub> (3.73–7.44 wt%). Compared to the average sandstone value, the Bhuban sandstones are depleted in the CaO (1.73% avg.), Na<sub>2</sub>O (1.19%), K<sub>2</sub>O (2.80%) and enriched in SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>. The geochemical characteristics suggest an active continental margin and oceanic island arc setup for the Bhuban sediments. The Chemical Index of Alteration (CIA) values (43.52–74.71) indicate low to moderate nature of chemical weathering of the source areas. Whereas the Chemical Index of Weathering (CIW) values (47.22–88.72) indicate low to higher degree of weathering in the source region. The Eu/Eu\* 0.65, (La/Lu)<sub>N</sub> (10.48), La/Sc (2.97), Th/Sc (1.81), La/Co (0.92), Th/Co (0.55), Th/Cr (0.16) and Cr/Th (6.66) ratios as well as chondrite-normalized rare earth elements (REE) patterns with flat heavy rare earth elements (HREE) (Gd/Yb<sub>N</sub> = 1.69–2.17), enrichment of Light Rare Earth Elements (LREE) (La/Sm<sub>N</sub> = 3.10–3.73) and negative Eu anomaly support a felsic source rocks for the sandstones and shale of the Bhuban Formation.



4. Rakshit, R.; Bezbaruah, B.; Zaman, F., Bharali, B., *Locked crustal faults associated with the subducting Indian Lithosphere and its implications in seismotectonic activity in the Central Indo - Burmese Ranges, Northeast India*, 4. January 2022, Geofizika.

**Abstract:**

Northeast India is a geodynamic hotspot for tectonic activities where three different plates viz., Indian, Eurasian and Burma Plates collide and deform with respect to each other. Northeast moving Indian Plate subducting transversely beneath Burma Plate results in the formation of the Indo-Burmese Ranges (IBR). In central IBR, the north-south trending Churachandpur-Mao Fault (CMF) is situated in the east of the Mizoram-Tripura Fold belt. The northwest-southeast trending Mat River Fault or Mat Fault (MF), which is another major crustal-scale strike-slip transverse fault, upholds the movement of the CMF. In this work, seismotectonic analysis of these two active intra-plate faults which are related to the June-September 2020 earthquake series, have been discussed. It is observed from satellite imageries, earthquake data and confirmed by the field investigation that these faults are not directly involved in the generation of the earthquakes; rather epicenters are distributed in the junction between the MF and CMF. It is evident from the seismotectonic analysis that this stress is distributed through some northwest-southeast synthetic faults, located north of MF and parallel to it, close to the junction with the CMF. The focal solution of the strongest of the 2020 earthquakes, the 5.5 Mw Champhai earthquake (on 22nd June 2020 at 04:10 IST) in Mizoram shows that the principal nodal plane was aligning along MF. Therefore, it is these synthetic faults that are responsible for the earthquakes rather than the locked zone between intra-plate MF and CMF crustal faults. This juxtaposition has caused a major shift in the geodynamic regime in the central IBR. Champhai earthquake might not be the only large devastating earthquake in the region and could be followed by more major earthquakes in the future.

5. Neog, D.,Borgohain, P., *Effect of temperature on sandstone rock wettability behaviour: a study on the Barail sandstone outcrop of the Upper Assam Basin.*, Arab J Geosci , 15, 138 (2022). <https://doi.org/10.1007/s12517-022-09429-0>.

## **Abstract:**

Wettability alteration is the essential mechanism responsible for oil recovery by low-salinity water flooding in sandstone reservoirs. Relative permeability or contact angle data is needed to predict reservoir fluid-rock interaction or the wetting condition of hydrocarbon-bearing porous surfaces. Temperature changes, as well as reservoir fluid saturation, flow rate, viscosity, and pore geometry, all affect oil–water relative permeability behaviour. The influence of temperature on wettability alteration in low-salinity water flooding is difficult to discern due to inconsistent findings on wetting properties when the temperature of the crude oil-rock-water interaction is increased. As a result, the relationships between rock wettability and water/oil permeability ratio have both temperature-dependent and temperature-independent effects. The present study makes an attempt to analyse the effect of temperature on wettability alteration, taking into account the relative permeability behaviour and rock mineralogy of the Barail sandstone outcrop of the Upper Assam basin. This study incorporates the Barail sandstone outcrop of the Dillighat river section of Northeast India to investigate the effect of temperature on the wettability of the sandstone porous medium. The outcrop considered for the current study is a part of the petroliferous basin of Upper Assam, where the Barail sandstones are regarded as excellent reservoirs. The study region is defined as latitude 27° 07' 22"–27° 08' 25" N and longitude 95° 21' 3"–95° 22' 10" E on Survey of India topographic sheet no. 83 M/8. In the current study, the sandstone cores were flooded with low-salinity brine at elevated temperatures for five Barail sandstone cores. Core flooding experiments were carried out at two different temperatures, 70 °C and 85 °C, which correspond to the reservoir temperatures of some of the oil-bearing reservoirs in the Upper Assam basin. The purpose of this study is to investigate the role of temperature in modifying the reservoir wettability of sandstone rock in a water flood scheme. The current study highlights the existence of temperature-dependent oil–water relative permeability behaviour by examining the shifting of the crossover point saturation at elevated temperatures, resulting in wettability alteration, based on experimental analysis on Barail sandstone cores of the Upper Assam basin and rock mineralogy analysis for the five different sandstone samples.

6. Subhrajyoti Bhattacharyya, Borkha Mech Das, *Selection of optimum sand control techniques in some sand-producing fields of Assam Arakan Basin.*, *Arabian Journal of Geosciences*, Springer Volume 15, Article no. 338, Published online on 08.02.2022, <https://doi.org/10.1007/s12517-022-09600-7>.

## **Abstract:**

Sand production from oil and gas wells is a major operational problem leading to the spending of millions of dollars each year. Sand production can cause plugged wells, lead to erosion of equipment, and may reduce the well productivity. This paper tries to evaluate effective sand control techniques through the use of novel methodology and tools which can be employed in

sand-producing fields. In this study, core samples of five sand-producing oil wells of Assam Arakan Basin were collected, and those samples were first disintegrated with a hammer to obtain the sand grains. The sand samples were then acid washed, decanted with water, and oven-dried to ensure that all the sand grains were disintegrated correctly and to make them ready for performing laboratory analysis. Particle size distribution (PSD) study was then carried out through the dry sieving method. After the calculation of cumulative weight % and grain size in each of the sieves from the ASTM sieve conversion chart, “S”-shaped distribution curve was constructed for each of the wells and well completion parameters like ( $D_{10}$ ,  $D_{40}$ ,  $D_{50}$ ,  $D_{90}$ ,  $D_{95}$ ) were calculated from the curve. Sorting coefficient (SC), uniformity coefficient (UC), and fines content were then calculated for each of the wells using the standard formulas used in the industry, and by comparing the calculated values of these parameters with standard tables used in industry, the most effective sand control technique was determined for each of these wells. In my study,  $D_{10}$  (<0.4 mm),  $D_{40}$  (<0.3 mm),  $D_{50}$  (<0.3 mm),  $D_{90}$  (<0.2 mm),  $D_{95}$  (<0.2 mm), (SC < 5), (UC < 2), (fines < 0.5%), and gravel size range from 1 to 2.2 mm and by comparing these calculated values with standard tables, standalone alone screen (SAS) (wire-wrapped screen) with screen slot size  $D_{50}$  and gravel pack of 12/20 US Mesh with screen size ranging from 500 to 540 micron was found to be the most effective sand control technique for the five sand-producing wells. Also, the collected sand samples contain coarse sand (0.83–0.9%), fine sand (45.96–46.3%), medium sand (49–49.3%), very fine sand (3.1–3.39%), and slit and clay (0.54–0.84%). Although this paper has referenced some previous papers where studies on production sand control in oil wells have been performed, the novelty in this study lies in the use of simple tools and experimental methodology employed for determining the most effective sand control technique for these wells located in a significant hydrocarbon producing basin and oil field.

7. Bichakshan Borah, Borkha Mech Das, *A review on applications of bio-products employed in drilling fluids to minimize environmental footprint*, *Environmental Challenges*, Elsevier Volume6, page 1-18. Published on January 2022. <https://doi.org/10.1016/j.envc.2021.100411>.

#### **Abstract:**

The continuous growing requirement in energy and shrink in the production together calls for thrive in new technologies in the oil and gas industry. Understanding of drilling fluid properties aid to design a fluid system with better properties that can be useful for drilling non-traditional hydrocarbon reservoirs. Drilling fluids are colloids to which a numbers of additives have been added in order to perform some specific properties. Conventional chemical additives that are employed to regulate properties of drilling fluids pose various problems because of their environmental and personnel safety issues. Some of these additives are toxic, non-biodegradable and have a negative impact on the environment. The oil and gas industries produces a huge amount of spent drilling fluid, produced water, and accumulated drill cuttings from drilling

operations, which are the sources of environmental pollution. Present day's environmental safety concerns are triggering the research and use of alternative multifunctional biodegradable and environmentally friendly drilling fluid additive. Hence comes the play of bio products to bypass these challenges. This review article is undertaken to highlight the application of some green bio products in drilling fluid to aid researchers and the oil and gas industry. This article also emphasizes how these bio products support in improvement of the drilling fluid properties while remaining cost effective.

**8. Debashree Dutta, Shailaj Bharadwaj, Dhiraj Kumar, Borkha Mech, *Development of a nano-based drilling fluid using copper nanoparticles for Upper Assam formations: rheological interpretation*, Petroleum Science and Technology. Published online on 7.03.2022 Doi:10.1080/10916466.2022.2047066.**

**Abstract:**

Assam shelf holds a high prospective in hydrocarbon exploration and drilling in such areas would lead to economic growth of the country. The research aims to find the puissance of nano-based drilling fluids (NDF) in Upper Assam formations. Exploration of oil from the depleted reservoirs of Upper Assam has made advanced drilling techniques indispensable. The study presents its novelty by formulating a NDF using copper nanoparticles (CNPs) suitable in Upper Assam. Exorbitant cost of nanoparticles (NPs) has been dealt by resorting to in-house synthesis CNPs adopting the technique chemical reduction. Characterization of NPs involved Ultra Violet (UV) Visible Spectrophotometer where absorbance peaks occurred within 500–650 nm, particle size analyzer where average size was 11.2 nm and Fourier transform infrared transform. Effect of CNPs on 2% bentonite drilling mud was analyzed by increasing CNPs concentration from 10% to 50% by mass and effect with increasing temperature, pressure and salinity on optimized mud has been detailed. Around 10% CNPs were effective in water-based drilling fluid. High pressure high temperature analysis indicates an enhanced rheological property as compared to the properties obtained at ambient temperature and pressure, although no change in properties were observed after 120–130 °C.

**9. Bondita Robidas, Subrata Borgohain Gogoi, *The effects of SKO on Assam crude oil*, Korea-Australia Rheology Journal.1-13. <https://doi.org/10.1007/s13367-022-00028-9>.**

**Abstract:**

The energy demand for crude oil (CO) has increased globally which encourages the growth in the petroleum industry worldwide. When CO is transported through a pipeline over long distances, due to the change in environmental circumstances, the flow behavior of CO also

changes. To improve the flowability of CO through the pipeline, a better understanding of the rheological behavior of CO is very important. In this paper, several experiments were conducted to improve the flowability of CO through pipeline transportation. Dilution of CO with its products like Superior Kerosene Oil (SKO) was selected as it improves the CO flowability through the pipeline and is economically affordable. In this study, the effect of SKO on API gravity, Pour Point, Gel Point, Viscosity Gravity Constant, and rheological parameters were studied for the CO of Upper Assam Basin, Assam. SKO was mixed with CO in different ratios to examine the effect of SKO on it. The results obtained showed that with the addition of SKO, API increases, the minimum limit of attaining paraffinic nature of CO samples can be determined, heavier CO may not always have high Pour Point and Gel Point. The variation in yield stress of CO with SKO was also observed. Hershel-Buckley Model (HBM) was used and from the three parameters of HBM, the shear-thinning or shear thickening behavior of CO was determined. Therefore, this paper attempts to study the flow behavior of CO and also to identify the % of SKO required for improving their flowability through the pipeline. Keywords: API gravity · Pour point · Viscosity · Viscosity gravity constant · Rheological parameters.

**10. Sarmah S, Gogoi SB, *Design and Application of an Alkaline-Surfactant-Polymer (ASP) Slug for Enhanced Oil Recovery: A Case Study for a Depleted Oil Field Reservoir, Petroleum Science and Technology.* <https://doi.org/10.1007/s13367-022-00028-9>.**

#### **Abstract:**

Three chemicals alkali, surfactant, and polymer owing to their unique properties were thoroughly investigated on a laboratory scale to identify an optimal chemical enhanced oil recovery (CEOR) slug for depleted oil field reservoirs. A series of laboratory-scale experiments were conducted on crude oil (CO) and a reservoir rock of Barail formation. CEOR combinations were studied based on interfacial tension (IFT), emulsion stability, thermal stability, phase behavior analysis, rheology study, core flooding, economic evaluation, and modeling and simulation for optimization of CEOR application. Three anionic surfactants black liquor (BL), sodium dodecyl sulfate (SDS), and sodium dodecyl benzene sulfonate (SDBS), three nonionic surfactants Triton X-405 (TX 405), Tergitol 15-s-7 (TG7), and Tergitol 15-s-9 (TG9) were chosen for the study. The addition of co-surfactant propan-2-ol and alkali sodium hydroxide (NaOH) resulted in a much lower IFT of the SA slug up to 0.05 mN/m. Emulsification of a combined SA slug containing SDBS, TG9, propan-2-ol, and NaOH was found to be maximum whereas all the samples were observed to be thermally stable. Laboratory core flooding study of the designed

ASP gave an overall recovery efficiency of 33.25% at 12.566 chemical cost (\$)/incremental bbl oil whereas simulation run resulted in a recovery of 47%.

11. Hazarika K, Gogoi SB, Kumar A, *Polymer flooding and its effects on enhanced oil recovery special reference to Upper Assam Basin*, **Petroleum Research**. <https://doi.org/10.1016/j.ptlrs.2022.03.003>.

#### **Abstract:**

Chemical Enhance oil Recovery (CEOR) technology is getting more attention since energy crises are getting worse and frightened. Successful application of polymer flooding depends on the evaluation of rheological and solution properties of injected slug at reservoir conditions, which is function of polymer concentration, salinity, temperature and shear rate. Poly acryl amide (PAM) is commonly used polymer in polymer flooding technique. However, comparative study with other polymers such as xanthan gum(XG) is required while selection of appropriate polymer for CEOR. In present study, the recovery efficiency of PAM and XG as a polymer has been evaluated for application as chemical EOR agent for tertiary phase polymer flooding in Upper Assam basin. The comparative study between PAM and XG has been done in terms of rheological properties. Core flooding experiment of polymer flooding has also been tested to determine the recovery efficiency of the PAM and XG polymer solutions. The results showed that these polymers exhibit favorable salt tolerance, temperature resistance, and recoverable viscosity after shearing, reasonable thickening behavior and improved viscosity enhancement properties due to presence of hydrophobic association in the polymer main chains. Core flooding experiment of polymer flooding has also been tested to determine the recovery efficiency of the PAM and XG polymer solutions. Results show that macroscopic sweep efficiency is the dominant factor during recovery. While an injection of hydrogel polymer to the reservoir is to increase a viscosity of fluid containing water so that the fluid is more difficult to flow than the oil, and as a result, the oil production increases. Shear thinning behavior was observed in case of PAM indicating predominance of the frontal advance theory. As PAM seems to be following both piston like movement and frontal advance theory it can be efficiently enhancing the macroscopic sweep efficiency as well as microscopic displacement efficiency. The overall recovery efficiency of 53% of OOIP was determined for PAM flooding. The overall recovery efficiency by XG polymer flooding was found to be 45%, signifying its lesser efficiency in comparison to PAM. Success of the projects also depends on cost analysis. Simulation by Computer Modelling Group (CMG) study has also been carried out to validate the experimental findings.

12. Sombir Pannu, Ranjan Phukan & Pankaj Tiwari , *Experimental and simulation study of surfactant flooding using a combined surfactant system for enhanced oil recovery*, **Petroleum Science and Technology**, DOI: 10.1080/10916466.2022.2052089.

## **Conference Papers**

1. Gogoi, M; Sarmah, R. K.; Goswami, T. K.; Mahanta, B. N.; Laishram, R.; Saikia, H., *Petrography and Geochemistry of the Extra-peninsular Gondwana Sandstones from West Kameng District of Arunachal Pradesh: implications for provenance, tectonic setting and palaeoweathering*, **Abstract No: 3512-3186.**

### **Abstract:**

Extra-peninsular Lower Permian Gondwana rocks of Eastern Himalaya exposed in parts of West Kameng District of Arunachal Pradesh were studied to decipher the provenance, tectonic setting, palaeo-weathering and climatic conditions prevailed during sedimentation. Based on detrital modes, the sandstones were classified as quartz wacke and feldspathic wacke. The tectonic discrimination diagrams reveal that the detritus were derived from craton interior and quartzose recycled orogen with low-rank metamorphic rocks as the source. Clay mineral assemblage indicates a palaeo-alkaline environment during the deposition of Gondwana sediments. The geochemical composition of the sandstones points towards a passive margin set up of deposition and quartzose sedimentary source rocks. Trace element concentration is in concurrence with the average Upper Continental Crust {UCC} with noticeable low values of Uranium (U), Cesium {Ce} and Terbium {Tb}. These rocks have high LREE/HREE ratios with negative Europium (Eu) and Cesium (Ce) anomaly. Higher CIA, PIA and CIW values depict medium to intense chemical weathering in the source terrain. Major oxide composition suggests a humid climate of deposition of these Gondwana sediment.

2. Pranjit Kalita,P., Goswami,T. K., Mahanta,B.N., Laishram,R., Saikia,H., Gogoi, M., *Ductile shear across MCT: Garnet inclusion trail geometry in the rocks of the Dirang Formation, Western Arunachal Himalaya, India*, **Abstract No: 2803-2362.**

### **Abstract:**

The metasedimentary rocks of the Dirang Formation, in the footwall of the Main Central Thrust (MCT) in the western Arunachal Himalaya, preserve the records of ductile sheared high strain zones imprinted with outcrop to grain-scale kinematic indicators. The asymmetric close to open folds in quartzites and garnetiferous mica schists have the axial plane trending almost NNW / NNE dipping at high angles to ENE/WNW. There may be a late ductile shear across MCT, coeval with the formation of these close to open F2 folds superposed on earlier NNE plunging F1 folds in the rocks of Dirang Formation, suggesting a top-to-NNE sense of movement. In the garnetiferous mica schist, the sub-vertical limbs of the NNW trending F2 folds are associated with S2 crenulation cleavage which is superposed on the earlier SO/S1 composite cleavage. The curved inclusion trails in the garnet porphyroblasts indicate a top-to-the left sense of shear in most of the sections bearing a few inclusion trails with top-to-right sense of shear. Inclusion trails at a high angle to S2, banding of the inclusion trails and parallelism with the rim are observed. Banding of the inclusion trails indicates greater shortening across S2 postdating the growth of the garnet. We construe that the NNE trending shear has to be a component of the N-S horizontal compression due to the post-collisional movement of the Indian plate where rocks across MCT have undergone ductile deformation.

3. Dhruvajyoti Neog, Amte Ayesha Siddiqua Rahman, *Characterization of formation water for feasibility analysis of injection water for enhancing crude oil recovery in a part of the sandstone porous media of the upper Assam Basin*, International Conference on Water Management (ICWM), Department of Petroleum technology, Dibrugarh University, Assam, India, 7<sup>th</sup>-8<sup>th</sup> Feb' 22, Water Management, Subrata Borgohain Gogoi, Pranab Boral (Editors), Jenny Stanford Publishing.

### **Abstract:**

The characterization of in-situ formation water in oil reservoirs plays a critical role in the evaluation of the reservoir rock characteristics. The pH of the produced formation water that flows along with oil and gas infers the current wetting properties of the reservoir rock. The porous media belonging to part of the Tipam and Barail formations of the upper Assam basin are mostly water-wet sandstone rocks that often result in high water cut issues. This produced water, after collecting at surface installation and subsequent treatment in the effluent treatment plant, meets the criteria for injection into the sub-surface formations to maintain reservoir pressure and the flowability in oil wells that lack sub-surface pressure to push well fluids into the wells. Low salinity water flooding is a preferred method of oil production to increase oil recovery from aged



oil fields. In the current work, formation water from the upper Assam basin was modified to smart water with the addition of divalent salt ions to examine its performance with monovalent salt ions. This paper characterises nine (9) wellhead water samples from parts of the oilfields of Tipam and Barail formations in the upper Assam basin. The evaluation includes the analysis of pH, conductivity, turbidity, total dissolved solids (TDS), dissolved oxygen (DO), oil and grease (O & G), salinity (Sal), and determination of inorganics by flame photometer. The findings of the current study reveal that smart water can enhance crude oil recovery in the upper Assam basin compared to low salinity water, as the interaction of this water with rock and crude oil results in alteration of the rock's wetting conditions.

4. Debasish Konwar, Subrata Borgohain Gogoi, Tapan Jyoti Gogoi, *Development of a simulation model for the treatment of Oil Field Produced Water of Upper Assam Basin*, International Conference on Water Management (ICWM), Department of Petroleum technology, Dibrugarh University, Assam, India, 7<sup>th</sup>-8<sup>th</sup> Feb' 22, Water Management, Subrata Borgohain Gogoi, Pranab Boral (Editors).

#### **Abstract:**

Oil Field Produced Water (OFPW) contains varying number of impurities that is harmful for the environment. The Physico-chemical characterisation of OFPW reveals the presence of Total Dissolved Solids (TDS), Suspended solids (SS), Turbidity, Dissolved Oxygen (DO), Conductivity, Bio-chemical Oxygen Demand (BOD). The inorganic characterisation was also carried out and presence of cations and anions were found in OFPW. Hardness, Alkalinity, Oil and Grease (O&G) content of OFPW were also determined by standard titration methods. The concentration of some of the parameters were found to be above the limit set by Central Pollution Control Board (CPCB) general standards for discharge of environment pollutants (CPCB guidelines for disposal water quality monitoring, 2017). Treatment of OFPW must be carried out to reduce the contaminants of OFPW before disposing into the environment. Initial gravity methods were carried out for the separation of OFPW. Various pre-treatment physical methods were carried out like Tilted Plate Interceptor (TPI), Dissolved Air Flootation (DAF) and sand filter (SF) prior to membrane treatment to reduce the TDS and SS content of OFPW. Finally, membrane treatment of OFPW were done and the parameters were found to be within the range of CPCB. Finally, a simulation model was developed using GPS-X software. Simulation was carried out for n number of time period to observe the filtration efficiency of the model. The results of the simulation were presented graphically to correlate the removal efficiency in each stage of the treatment process. The simulation helped us to visualise the

treatment model and to find the effect of change of contaminants with the change of initial conditions.

**5. Tapan Jyoti Gogoi, Subrata Borgohain Gogoi, Pranab Boral, Debasish Konwar, *Characterization and Correlation of untreated OFPW of Upper Assam Basin*, International Conference on Water Management (ICWM), Department of Petroleum technology, Dibrugarh University, Assam, India, 7<sup>th</sup>-8<sup>th</sup> Feb' 22, Water Management, Subrata Borgohain Gogoi, Pranab Boral (Editors).**

### **Abstract:**

The untreated Oil Field Produced Water (OFPW) samples were characterized by Physico-chemical Parameters (PP), Inorganics Elements and Anions (IEA), and Organic Compounds (OC), which were further compared with the disposal permissible limit of Central Pollution Control Board (CPCB). The PP analysis showed turbidity, salinity, Total Dissolved Solid (TDS), Total Suspended Solid (TSS), Total Solid (TS), Oil & Grease (O&G), and Biochemical Oxygen Demand (BOD5) to be outside the permissible limit of CPCB. The BOD5 has exponentially decreased with time. From the correlation analysis of PP, it was found that pH is positively correlated to Dissolved Oxygen (DO) but negatively correlated to turbidity, Electrical Conductivity (EC), salinity, TDS, TSS, TS, O&G, alkalinity, hardness, and BOD5. It was further validated with corresponding figures and by equating equation 2.40 with the experimental values the proportionality constant of PP i.e.,  $K_{pp}$  was equal to  $1.1 \times 10^{-27}$ . The IEA analysis showed Na, Li, Sr, Pb, and F to be outside the permissible limit of CPCB. From the correlation analysis of IEA, it was found that Na is positively correlated to K, Ca, Li, Mg, Sr, Fe, Zn, Pb, Mn, As, F,  $Cl^-$ ,  $HCO_3^-$ ,  $SO_4^{2-}$  and  $CO_3^{2-}$ . It was further validated with corresponding figures and by equating equation 2.42 with the experimental values the proportionality constant of IEA i.e.,  $K_{IEA}$  was equal to  $2.1 \times 10^{-5}$ . The OCs obtained were Poly Aromatic Hydrocarbons (PAH), Benzene Toulene Ethylbenzene and Xylene (BTEX), naphthalene, organosilicon compounds, alkene, alkanes, organic acids, glycol ethers, alkanethiol, saturated fatty acids, amino alcohol, cyclic compounds, esters, and phenols. In addition to PAHs, aromatic benzene derivatives, phenol, and alkylated phenol derivatives, alkyl thiol, and alkenes were also found in sufficient concentrations as OCs in untreated OFPW samples. Therefore, it is an urgent need to reduce the excessive contaminants present in the OFPW samples through different treatment methods available. After successful removal of contaminants from OFPW, it can be used for reinjection into the sub-surface reservoir for secondary pressure maintenance or can be used in E&P industries and people located near the E&P industries for their regular requirements either for cleaning, agriculture, and household purposes. These E&P industries are mostly located in the water-stressed areas where any possible use of treated OFPW would be considered beneficial for

the people. The excess treated OFPW can be disposed of in the disposal wells which are located near the Exploration and Production (E&P) industries.

6. Pranab Boral, Subrata Borgohain Gogoi, *Smart Water condition for Sandstone Oil Reservoir of Tipam and Barail group of rocks*, International Conference on Water Management (ICWM), Department of Petroleum technology, Dibrugarh University, Assam, India, 7<sup>th</sup>-8<sup>th</sup> Feb' 22, Water Management, Subrata Borgohain Gogoi, Pranab Boral (Editors).

#### **Abstract:**

Smart Water (SmW) Enhanced Oil Recovery (EOR) in sandstone oil reservoirs has been a major topic of interest. Tipam and Barail group of rocks which constitutes most of the oil reservoirs of Upper Assam Basin (UAB) show 2-3 % of feldspar, 40-60% of silica (SiO<sub>2</sub>), CaO, Na<sub>2</sub>O and other clay minerals like Kaolinite, Illite and Chlorite. The mineralogy composition of reservoir rock behaves as active exchange base while flooding any chemical or brine. Adsorption - Desorption of ions occur between the rock mineral surface and brine. Significant amount of clay minerals are required, preferably non swelling clay to achieve water wet condition. Most of the oil fields of UAB have low saline formation water between 3000-4000 ppm, hence increase or decrease of ion concentration of the SmW during flooding depends on brine and rock composition. There are three most important parameters which includes reservoir rock mineral study, Formation Water (FW) and Crude Oil (CO) analyses to produce stable SmW sample. The reaction of SmW after flooding and its Recovery Factor (RF) under different rock mineral property, CO and FW can only be studied after several core flooding process. In this paper we study the SmW flooding condition for sandstone oil reservoirs of UAB. This includes the oil-bearing formations of Tipam and Barail group of rocks. Rock property includes Porosity (Phi), Permeability (K) and SEM micrographs. Crude oil characterization includes API, Viscosity and Acid Number. Salinity, Total Dissolved Solvents (TDS), Total Suspended Solids (TSS) and conductivity is checked for FW.

7. Sekhar Gogoi, Subrata Borgohain Gogoi, *Smart Water in Enhanced Oil Recovery: A Review*, International Conference on Water Management (ICWM), Department of Petroleum technology, Dibrugarh University, Assam, India, 7<sup>th</sup>-8<sup>th</sup> Feb' 22, Water Management, Subrata Borgohain Gogoi, Pranab Boral (Editors).

## **Abstract:**

Water is an inevitable part of the oil and gas industry. Water can be detrimental as well as beneficial. But it is unavoidable. Hence one of the best ways to make water into a win-win scenario is to make it smart. With the easy oil being of the past and growing demands of fuels, various methods are attempted to recover as much residual oil in present reserves. Among these chemicals Enhanced oil recovery has been very moving towards advancement. With the water being key to recovery, smart water is way better than simply water. This study focuses on the smartness of water in its usage in Enhance Oil Recovery Process. The most basic way is to use water as a flooding agent to drive hydrocarbons through the reservoir towards the production well. The inspiration for water usage has come from the natural water drive mechanism. Artificial water flooding has long been used for fluid movement from point of injection towards the point of production. Thus, it is natural that a step further in smart water is attempted. The hydrocarbons, crude oil, have an affinity towards rock pore surfaces. If this affinity can be broken, crude oil can be released from pore space. But instead of crude oil, another fluid/ions will now have an affinity towards the rock surface. This second fluid can be smart water which will compete with crude oil for adhesion to the rock pore surfaces. There are mechanisms that can bring about this change in adhesion. Hence smart water is also in some literature and research areas referred to as Engineered Water. Smart water can bring about behaviour changes of fluid interaction. It also has limitations and compatibility issues which can be alleviated to some extent by the usage of hybrid smart water. In chemical enhanced oil recovery, surfactants, alkali, polymers can assist smart water to bring about a better flow of fluids. The article shall attempt to discuss the mechanism, the usage and suitability of smart water in the oil and gas sector. It will touch upon wettability, adhesion, fluid interaction, salinity, mineral dissolution that occurs when smart water contacts the pore surfaces. The pH change with positive or negative charged rock pore surface is a very helpful feature. The utilization of ionic exchange/ adsorption has influenced wettability alteration. Different ions when added to water can interact with the pores. The effects can be at the microscopic level as well as macroscopic level. Smart water can revolutionize the oil and gas recovery process as water is a good carrier of many chemical agents and can be tuned as per the requirement of the reservoir. Hence this paper put light upon the benefits of smart water usage in Chemical EOR methods.

## **Conferences/ Workshops Hosted**

1. ATAL Academy FDP on *Management of Hydrocarbon Exploration and Production Waste* (14 technical sessions) was organized by the **Department of Petroleum Technology, Dibrugarh University.**

**Duration:** 7<sup>th</sup> to 11<sup>th</sup> February, 2022

**Coordinator:** Dr. Dhrubajyoti Neog

**No. of participants:** 118

2. An AICTE Training and Learning (ATAL) Academy sponsored online Faculty Development Program (FDP) was organized by the **Department of Petroleum Technology, Dibrugarh University.**

**Duration:** 7<sup>th</sup> to 11<sup>th</sup> March 2022

**Coordinator:** Dr. Ranjan Phukan and Mr. Prasun Banik

**No. of participants:** More than 100

3. *Aerioleum 22* was organized by the **Department of Petroleum Technology, Dibrugarh University.**

**Duration:** 17<sup>th</sup> to 23<sup>rd</sup> January, 2022.

**Coordinator:** Dr. Borkha Mech

**No. of participants:** 100

**Number of Papers presented :** 20.

4. *Paper presentation contest, Petrofest 2022* was organized by the **Department of Petroleum Technology, Dibrugarh University.**

**Duration:** 24<sup>th</sup> – 26<sup>th</sup> March.

**Coordinator:** Dr. Borkha Mech

**No. of participants:** 100

**Number of Papers presented :** 20

5. An International Conference on *Water Management* was organized by the **Department of Petroleum Technology, Dibrugarh University.**

**Duration:** 7<sup>th</sup> & 8<sup>th</sup> February, 2022.

**Coordinator:** Dr.(Mrs.) Subrata BorgohainGogoi.

**Co-coordinator:** Dr. Ranjan Phukan.

**No. of participants:** 80

**Number of Papers presented :** 37

### **Awards and Recognitions received by Faculty Members**

1. **Prof Kalpana Deka Kalita** acted as a **panelist** for Panel discussion on "*Women's Challenges and achievements in Earth Sciences*" on the occasion of "*International Women's Day*" on 7<sup>th</sup> March, 2022 organised by **Wadia Institute Himalayan Geology, Dehradun** in collaboration with **Ministry of Women and child Development and National Implementation Committee, Govt of India** as a part of **Azadi ka Amit Mahotsav**.

2. **Dr. Siddartha Kumar Lahiri** acted as a **resource person** to conduct the Session-3 for the online faculty development program (FDP) "*Recent Trends in Upstream Petroleum Technology*" (from 7<sup>th</sup> to 11<sup>th</sup> March 2022); organized by the **Department of Petroleum Technology, Dibrugarh University, Assam** and sponsored by the **AICTE Teaching and Learning (ATAL) Academy**. The theme of the session conducted on 8<sup>th</sup> March 2022

was “*Basin-scale morphotectonic studies by using the geophysical data archive – A heuristic approach*” .

3. Prof. Subrata Borgohain Gogoi was invited as a **resource person** in the following programs:

24 <sup>th</sup> Mar’ 22	Invited as a resource person to deliver a talk on, “ <i>EOR in CO<sub>2</sub> Emission Reduction</i> ”, at <b>PETROFEST</b> organized by <b>SPE-DU Chapter, in the Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
9 <sup>th</sup> Mar’ 22	Invited as a resource person to deliver a talk online on, “ <i>Enhanced Oil Recovery</i> ”, at the <b>ATAL FDP</b> on, “ <i>Recent trends in upstream Petroleum Technology</i> ”, in the <b>Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
9 <sup>th</sup> Feb’ 22	Invited as a resource person to deliver a talk online on, “ <i>Management of Hydrocarbon Exploration and Production through EOR</i> ”, at the <b>ATAL FDP</b> on, “ <i>Management of Hydrocarbon Exploration and Production</i> ”, in the <b>Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
11 <sup>th</sup> Jan’ 22	Invited as a resource person to deliver a talk online on, “ <i>Enhanced Oil Recovery: an overview</i> ”, at the <b>ATAL FDP</b> on, “ <i>Advanced Experimental and Simulation Research Trends in Chemical Engineering (AESRTCE-2022)</i> ”, in the <b>Department of Chemical Engineering, National Institute of Technology Hamirpur.</b>

4. Dr. Borkha Mech was invited as a **resource person** in the following programs:

7 <sup>th</sup> Feb’ 22	Invited as a resource person to deliver a talk online on, “ <i>Water pollution aspects from waste drilling mud disposal</i> ”, at <b>International Conference on Water Management</b> held on 7 <sup>th</sup> – 8 <sup>th</sup> February 2022 under <b>AICTE</b> organized by <b>Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
26 <sup>th</sup> Feb’ 22	Invited as a resource person to deliver a talk online on, “ <i>Drilling Fluids Technology and its effect to Environment</i> ”, in the <b>Department of Petroleum Engineering, School of Ocean Engineering, VELS University, Chennai.</b>
11 <sup>th</sup> Mar’ 22	Invited as a resource person to deliver a talk online on, “ <i>Drilling</i> ”

	<i>Fluids Technology and its effect on the Environment</i> ”, at ATAL FDP on, " <i>Management of Hydrocarbon Exploration and Production</i> ", in the <b>Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
13 <sup>th</sup> Mar’ 22	Invited as a resource person to deliver a talk online on, “ <i>Drilling Fluids Technology</i> ” in the <b>Department of Petroleum Engineering, Presidency University, Bangalore.</b>

4. **Dr. Dhrubajyoti Neog** was invited as a **resource person** in the following programs:

24 <sup>th</sup> Mar’ 22	Invited as a resource person to deliver a talk on " <i>Underground Storage of Hydrocarbon Fluids</i> " at <b>PETROFEST</b> , organized by <b>SPE-DU Chapter, at Dibrugarh University.</b>
11 <sup>th</sup> Feb’ 22	Invited as a resource person to deliver a talk on " <i>Flow assurance in oil well production systems</i> " at the <b>ATAL FDP on "Management of Hydrocarbon Exploration and Production Waste"</b> in the <b>AICTE ATAL Academy FDP in the Department of Petroleum Technology, Dibrugarh University, Dibrugarh.</b>
9 <sup>th</sup> March’ 22	Invited as a resource person to deliver a talk on " <i>Oil Well Production Technology and associated issues</i> " at the <b>ATAL FDP on "Recent Trends in Upstream Petroleum Technology"</b> in the <b>AICTE ATAL FDP in the Department of Petroleum Technology, Dibrugarh University.</b>

### **Awards and Recognitions received by research scholars**

1. The paper entitled, “*Characterization and Correlation of untreated OFPW of Upper Assam Basin*”, was awarded **the best paper presenter** in Technical Session 2, “*Water Pollution*” at the **International Conference on Water Management (ICWM-2022)** from 7/2/22–8/2/22, under the aegis of **All India Council for Technical Education (AICTE), New Delhi** organized by the **Department of Petroleum Technology, Dibrugarh University**. The authors were **Tapan Jyoti Gogoi, Subrata Borgohain Gogoi, Pranab Boral and Debasish Konwar.**



2. The paper entitled, “*Experimental study of low saline smart water and polymer hybrid for EOR in a sandstone reservoir*”, was awarded the **best paper presenter** in Technical Session 3, “*Smart Water for EOR*” at the **International Conference on Water Management (ICWM-2022)** from 7/2/22–8/2/22, under the aegis of **All India Council for Technical Education (AICTE), New Delhi organized by the Department of Petroleum Technology, Dibrugarh University**. The authors were **Shilpi Sarmah and Subrata Borgohain Gogoi**.
  
3. The paper entitled, “*Characterization, Correlation and modelling of PP of untreated OFPW with emphasis on Upper Assam Basin*”, was awarded the **best paper presenter** in **MRIGANA** – paper presentation under the category “*Management and HSE*” at the **PETROFEST 2022 – Fueling the Future** from 24/3/22–26/3/22, organized by **SPE Dibrugarh University Student Chapter (6112)**. The authors were **Tapan Jyoti Gogoi, Subrata Borgohain Gogoi, Pranab Boral and Debasish Konwar**.
  
4. The paper entitled, “*Correlation analysis and characterisation of oil field produced water of Upper Assam Basin*”, was awarded the **2<sup>nd</sup> best paper presenter** in **MRIGANA** – paper presentation under the category “*Management and HSE*” at the **PETROFEST 2022 – Fueling the Future** from 24/3/22–26/3/22, organized by **SPE Dibrugarh University Student Chapter (6112)**. The authors were **Debasish Konwar, Subrata Borgohain Gogoi and Tapan Jyoti Gogoi**.
  
5. The paper entitled, “*An efficient Enhanced Oil Recovery (EOR) process using polymer augmented Surfactant-Alkali (SA) flood*”, was awarded the **best paper presenter** in **MRIGANA** – paper presentation under the category “*Upstream and Downstream Oil and Gas sector*” at the **PETROFEST 2022 – Fueling the Future** from 24/3/22–26/3/22, organized by **SPE Dibrugarh University Student Chapter (6112)**. The authors were **Shilpi Sarmah and Subrata Borgohain Gogoi**.
  
6. **Bichakshan Borah and Saurav Bhattacharjee** secured **1<sup>st</sup>** position in ‘*Case study challenge*’ organised by **SPE Dibrugarh University Student Chapter (6112)** on the occasion of “**Petrofest 2022**’- Fueling the future, held from 24<sup>th</sup>-26<sup>th</sup> March, 2022.
  
7. **Saurav Bhattacharjee** was awarded the **best paper award** in **Paper presentation contest** organized by **FIPI Dibrugarh University student chapter** on 21.1.22 under

category 2: **Optimization of well**. The authors were **Saurav Bhattacharjee** and **Dr. Borkha Mech**.

8. **Ms. Debashree Dutta** was awarded the **best poster** award in **AFISHE, Poster presentation** contest under “*Upstream Category*” organized by **SPE Dibrugarh University Student Chapter (6112)** on the occasion of “**Petrofest 2022**”- Fueling the future, held from 24<sup>th</sup>-26<sup>th</sup> March, 2022.

*FACULTY OF*  
*BIOLOGICAL SCIENCES*

## Research Publications in Journals

1. Nirangkush Borah, Pankaj Chetia and Chandan Tamuly, *Arenga westerhoutii* Griff.: *bioactive constituents, nutraceuticals, antioxidant and anti-diabetic potential of stem extract and an insight into molecular docking analysis*, **Natural Product Research**.

### Abstract:

Herein, we reported a systematic scientific study of *Arenga westerhoutii* Griff. by evaluating its bioactive components, nutraceuticals, antioxidant and anti-diabetic properties. Three major bioactive compounds were identified using HPLC and HRMS. Quantification of the components through HPLC yielded the presence of  $75.67 \pm 0.05$ ,  $38.19 \pm 0.10$  and  $13.11 \pm 0.02$  mg/mL of chlorogenic acid, ferulic acid and epicatechin respectively in 1 mg/ml of the extract. 50% MeOH hydro-alcoholic extract was found to show lowest IC<sub>50</sub> value in both in-vitro antioxidant (IC<sub>50</sub>  $\frac{1}{4}$   $2.925 \pm 0.12$  mg/mL, DPPH assay) and anti-diabetic assays (IC<sub>50</sub>  $\frac{1}{4}$   $18.03 \pm 0.18$  mg/mL, a-glucosidase assay). Further analysis by molecular docking study suggested the interaction of components towards a-glucosidase enzyme.

2. H. Borah and DS Bora, *Ecological and social determinants of Aedes aegypti and Aedes albopictus larval habitat in northeastern India*, **International journal of mosquito research**. 9(1)47-55.

### Abstract:

Dengue, the arboviral threat to public health affecting millions of people globally, is transmitted by the bite of female *Aedes aegypti* and *Aedes albopictus*. The factors contributing to *Ae. spp.* abundance is variable, region-specific, and needs to be identified region-wise for effective vector control programs. In this study, based on dengue fever case statistics from the previous years, we selected two representatives of natural (forest and riverine) and two urbanized (Oil industrial and tea-estates) areas of upper Brahmaputra valley and dengue prone Kamrup district in the lower Brahmaputra valley of Assam for mosquito surveillance through container search. The count of both species was the highest in the urbanized regions having higher container habitats. All the entomological indices, House index, Container index, and Breteau index were higher than the WHO criteria of dengue sensitive areas from pre-monsoon to post-monsoon seasons. The

temperature was the most prominent driver having a significant correlation with entomological indices with  $R^2$  values ranging from 0.825 to 0.965 in urbanized areas and 0.723 to 0.801 in natural areas, followed by rainfall and humidity. Response survey of inhabitants of the study sites revealed the status of awareness and practice regarding the vector habitats. The results indicated that the combined action of urbanization, social factors, and changes in meteorological factors have primarily contributed to the large population size of dengue vectors throughout the year. Adaptive expansion of the *Aedes* vectors warrants the adoption of necessary precautionary measures to prevent colonization by *Ae.aegypti* and *Ae.albopictus* in urbanized areas to prevent *Aedes*-borne diseases, dengue, chikungunya, and zika.

3. Moirangthem Kameshwor Singh, Dipjyoti Boruah, *An Insight on the Prospects of Biofloc Technology (BFT) in the Northeastern States of India*, *Asian Journal of Biological Sciences*, **11(1)**, 1-9.

**Abstract:**

Aquaculture farming is presently facing challenges in terms of effluent discharge it releases into the natural environment. Farmers opt for intensive culture methods for high production which results in deteriorated water quality of the surrounding habitat and introduces pathogen, leading to disease outbreak. The northeastern region of India is one of the hotspots of freshwater fish biodiversity in the world with approx. 300 fish species belonging to 10 different orders, 37 families and 114 genera. The region covers largest part of the Eastern Himalayan ranges. Topographically hilly regions are resource poor for aquaculture in terms of land and water and most of the land areas are also flood prone. Thus it caused the need of a sustainable aquaculture technology. This article focuses on an advanced technology, called Biofloc technology based on zero water exchange and wastes recycling produced inside the cultured system by utilizing the mixture of bacteria, algae, detritus forming the microbial floc. The water quality remains maintained due to the conversion of the toxic nitrogenous wastes of the cultured species into proteinaceous diet which can be eventually consumed by the cultured species itself, thus replacing the high cost fish feed available in the market. This novel technology proves to be a cost effective as it utilizes fewer resources in terms of water, space, energy and eventually capital

with a low operating and management cost. The northeastern states of India can adapt this technology for a high yield in fish production and to boost up the rural economy, employment generation and also to conserve the valuable species of the region.

### **Research Grants/Projects received**

- 1. Project title: Setting up of herbal garden in Dibrugarh University.**  
**P.I: Prof. L. R. Saika.**  
**Co-PI: Dr. Pankaj Chetia, Dr. Munmi Borkataky**  
**Funding Agency: NMPB, Ministry of AYUSH, Govt. of India**  
**Duration of the Project: March, 2022 – March, 2027**  
**Sanctioned Amount: Rs. 27 lakhs.**
- 2. Project title: Setting up of medicinal plant nursery at Dibrugarh University.**  
**P.I: Prof. L. R. Saika.**  
**Co-PI: Dr. Pankaj Chetia, Dr. Munmi Borkataky**  
**Funding Agency: NMPB, Ministry of AYUSH, Govt. of India**  
**Duration of the Project: March, 2022 – March, 2025**  
**Sanctioned Amount: Rs. 12.5 lakhs.**

### **Awards and Recognitions received by Faculty Members**

- 1. Dr Pankaj Chetia** received the *Prof. Arun Kumar Pandey Biodiversity Medal* from the East Himalayan Society for Spermatophyte Taxonomy (EHSST) in the National Seminar on “*Plant Taxonomy and Traditional Knowledge in the Himalayas and NorthEast India*” organised by the **Rajiv Gandhi University, Itanagar** during 21-22 February 2022.

*FACULTY OF*  
*SOCIAL SCIENCES*

## Research Publications in Journals

1. Borah, Partha Pratim, Rabin Deka and Ankur Jyoti Bhuyan, *Ethnicity and Fragmented Identity: Diverse forms of identity formation among the Misings of Assam*, *Asian Ethnicity*, Vol 23, No 1, pp 66-89.

### Abstract:

This paper articulates the issue of ethnicity and identity formation among the Misings of Assam. It navigates the life graph of the community and unearthed the subtlety involved in their identity formation, articulation and assertion. The nuances involved in their identity formation and the subsequent intra-community ethnic fragmentation reflect the fact that the case does not purely fit into a singular theoretical framework of either ‘*primordialism*’ or ‘*constructivism*’. Rather it necessitates the call for traversing through different theoretical frameworks. On a descriptive note, the paper tends to examine the role of social, political and historical forces influencing the Mising identity narratives. Besides delineating the historical trajectories of Mising identity in different historical periods, – pre-colonial, colonial and post-colonial – the study has explored the multiple processes of identity formation *vis-a-vis* migration, politics of (re)naming, role of middle class organisations and the vitality of script and language.

## Conference Papers

1. Rimon Bhuyan Gogoi , *The Citizenship Discourse in the Indigeneity Context*, **National Seminar** on “*Rethinking Citizenship in a Post-Colonial State: Identity and Conflict in Northeast India*”, March 24th-25th, 2022, Dibrugarh, Assam..

2. Rashmi Rekha Bhuyan, *Rai Bahadur Kanaklal Barua and ‘Discovering the Past’ in Colonial Assam*, in **International Conference on Recent Trends in Humanities, Language, Literature and Education**, organized by School of Humanities and Liberal Arts, Cluster University of Jammu in collaboration with Vidya Kutir Foundation, New Delhi on 27<sup>th</sup> March. 2022.



**Abstract:**

The practice of history writing in India got a new dimension from the late 18<sup>th</sup> century when the colonial administrators in India, educated in the 'Age of Enlightenment', started to reconstruct India's past in the European model of writing history. Following the trend, the Indian elites educated in the Western education system began to write about the history of India since late 19<sup>th</sup> century, although with a different tone. In fact, the colonial ideology of history writing by European historians was challenged or reacted by the Indian historians whose ideology was influenced by the ongoing nationalist movement in India against the British colonialism. In this stage, the nationalist historians tried to glorify ancient heritage with a pan-Indian perspective connecting the peripheries. Historians of Assam, located in the north-eastern corner of India was not also lagging behind. The history writing of Kanaklal Barua of late 19<sup>th</sup>-early 20<sup>th</sup> century Assam can be studied in this light. Following the ongoing nationalist ideology, Barua attempted to glorify Kamarupa as the ancient kingdom of Assam showcasing it as an integral part of mainstream Indian history since prehistoric era. Locating the writings of Kanaklal Barua in the historical studies of colonial Assam, the paper will attempt to study the various ways adopted by Barua with a view to reconstruct the Assamese nationality and ancient heritage of Assam by associating himself with Assam Research Society, publishing journal from the Society and making preparations for the construction of Assam Provincial Museum. Interpretative by nature, this paper will highlight the ideological facets of Barua in writing the history of Assam which was different from most of his contemporaries and inspiring many of his later researchers on this field.

## Published Book Chapters

1. Dr. Amrita Pritam Gogoi , *Gender, Guns and Guerrillas: Narratives From Maoist People's War of Nepal*. In: Nasreen Chowdhury and Paula Banerjee (eds), *Gender, Identity and Migration in India* (pp. 299-320), Palgrave: MacMillan, Singapore. 2022.
2. Bhuyan, Ankur Jyoti, TarunGogoi and Partha Pratim Borah., *Contextualising Democratic Governance in Bodoland: Changes and Challenges*, in M.Amarjeet Singh (ed.) *Autonomy and Democratic Governance in Northeast India*. London and New York: Routledge. ISBN: 978-367-72036-0 (hbk).
3. Borah, Partha Pratim, *Ethnic Identity and Language: Articulation and Contestations of Ethnic Identity among the Misings of Assam*, in K.Kokho, AthikhoKaisu and DailiNeli (eds.) *Tribes of Northeast India: Orality, Migration and Epistemology*. Jaipur and New Delhi: Rawat Publications. ISBN: 978-81-316-1234-7.

## Research Grants / Projects

**1. Project Title:** A Cross Sectional Study on Maternal and Child Health Status among *the Tribal people* in Five Districts of Upper Assam.

**PI:** Dr. Upasona Sarmah

**Co PI:** Dr. Bobby Dutta Saikia

**Funding Agency:** ICSSR ( Indian Council of Social Science Research)

**Duration of scheme:** 24 months.

**Amount:** Rs 15 Lakhs

## **Conferences/ Workshops Hosted**

1. A National Seminar on *Rethinking Citizenship in a Post-Colonial State: Identity and Conflict in Northeast India* was organized by the Department of Political Science, Dibrugarh University.

**Date:** March: 24th-25th, 2022.

**Convenors :** Dr. Rimon Bhuyan Gogoi & Dr. Priyanka Sharma

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## **Awards and Recognitions received by Faculty Members**

1. Dr. Priyanka Sharma delivered an invited Talk on *Gender and Sustainable Development: The Road Ahead* organized by College Women's Cell, NSS College, Parakkulam, 11<sup>th</sup> March, 2022.

*FACULTY OF  
COMMERCE AND MANAGEMENT  
STUDIES*

## Research Publications in Journals

1. Hussain, A., Barua P. & Sarma, T. R., *Reviving GI Status of Assam's Golden Muga Silk*, *Indian Silk*, May-June, Vol. 12 (Old-60), Issue -1. pp 20-23. ISSN - 0019-6355.

### Abstract:

The golden hued Muga silk of Assam received its Geographical Indication in the year 2007. The industry is yet to realize the economic benefits extended from the commercial use of GI. The known factors contributing to discouraging growth of the industry include ignorance among stakeholders about GI, existence of informal channels of distribution, lack of marketing efforts, communication gaps in the supply chain and lack of coordinated government efforts. The lack of standardization of prices geographically and lack of enforcement and testing agencies are evidences of the non-enforcement of GI in the industry. The article proposes a concerted effort among sericulture and handloom authorities, research institutions and grassroot stakeholders to achieve the revival of the GI "Muga silk of Assam".

2. Jutimala Bora and Pankaj Sahu, *Impact of social media on Tourism: A Study with Special Reference to Kaziranga National Park*, *Journal of Emerging Technologies and Innovative Research*, ISSN: 2349-5162, Vol: January,2022.

### Abstract:

Social media is one of the powerful media at the present time. People more often use the social media platform to collect information. The practice has been so large that in almost every sector there is a huge impact of social media. In present days the social media is extensively used in every sector of the industry and the tourism sector is not way behind. The entire north east over a long period of time growing as a hotspot of tourist destination and Kaziranga National Park being one of the most vital tourist destinations situated in Assam. Moreover, most people now a day, greatly depends on the social media before taking any decision. In respect to the tourism, the easy availability of the information and easy accessibility with pictures and videos always helps a person to plan their trip beforehand be it the location, booking of hotels weather conditions etc. Thus, an attempt have been made to study the social media as an aid in tourism

industry with reference to Kaziranga National Park based on some of the search queries. The study will be based on secondary data.

3. Jutimala Bora and Dhritabrata Jyoti Bharadwaj, *A Study on Tourists' Motivation and Behaviour*, *Journal of Interdisciplinary Cycle Research*, ISSN: 0022-1945, Vol.: January, 2022.

**Abstract:**

A plethora of tourist destinations exist around the world each offering a variety of products and services to attract visitors. This gives potential tourists the opportunity to choose a destination that stimulates their interests and motivates them to travel. Several empirical studies have explored similarities and differences in travel patterns and attitudes towards specific destinations between multiple groups. This study contributes to the overall understanding of what motivates tourists to travel to a specific destination which is a key factor for tourism business. The purpose of this study is to determine the travel behaviour and more specifically the travel motivations of tourists visiting different places and to come out with some suggestions for making the North East region an attractive place as tourist destination. This study is based on both primary as well as secondary data. Primary data has been collected from a sample of fifty respondents. Research is conducted by means of the distribution of questionnaires.

4. Jutimala Bora *A Statistical Investigation of the Effects of Size on Income Smoothing Behaviour of Companies Listed in NSE*, *Journal of Contemporary Issues in Business and Government*, ISSN: 2204-1990(P) 1323-6903(E), Vol.: March, 2022.

**Abstract:**

Financial reporting is a process of communicating financial information of the companies to different stakeholders. Financial reporting process of companies has been constantly facing the problem of satisfying different stakeholders with diverse needs and desires.

Satisfaction of one's needs leads to the dissatisfaction of others. In order to satisfy all kind kinds of stakeholders, there is a need to maintain a balance between the two extreme points i.e., higher profit and lower profit. Due to various reasons like increasing level of competition and loop holes in the accounting standards, Companies are using different techniques of Creative Accounting to manipulate the Accounts. There are various forms of Creative Accounting.

Income Smoothing is one type of Creative Accounting. In this study, it has been tried to determine the existence of Income Smoothing in the Companies listed in India and the association between the size of the companies and the Income Smoothing practices of Companies has also been studied.

**Methods:** Eckel Index has been calculated to detect the existence of Income Smoothing practices of Companies. Inferential Statistics like Chi Square Test and Binary Logistic Regression Model has been conducted.

**Findings:** Results show that Income Smoothing is prevalent among the Companies listed in India and Size of the Companies has been found as a significant factor affecting Income Smoothing Behaviour

5. Sanjay Rizal, Bipasha Chetiya Barua, *Contingent Purchase Behaviour of Generation Y towards Fast Food Products: An Investigation of Selected Antecedents*, *Journal of Positive School Psychology*, Vol. 6, No. 2, 963 – 970.

**Abstract:**

Contingent purchase are those purchase which are unplanned in nature but at the same time people like to take the decision of their purchase in rational way. Contingent purchases are very common where people find themselves in a situation where they tend to take the purchase decision but being rational in their purchase behaviour at the same time. The purpose of this study was to look into the contingent buying behaviour of Generation Y customers towards fast-food in Assam, India. In today's fast-food market, there are a lot of unplanned purchase happening but whether that unplanned purchase in Impulse or contingent in nature is still to be proved and this paper tries to identify the presence of contingent purchase in the fast-food market. In this study, 160 questionnaires were issued using the quantitative method, with a response rate of 94 percent. The study shows the string presence of contingent purchase behaviour among generation Y consumers in fast food products in Assam. By understanding the Contingent purchase behaviour in the fast-food market, Assam's local fast food restaurant directors and managers can improve the customer experience, fix problems, and eventually achieve high quality business.

6. Debanuj Khound, Bipasha Chetiya Barua, *Comparative Analysis of e-commerce Websites Operating in India Across Select Product Categories*, *International Journal of Humanities, Law and Social Sciences Published Biannually by New Archaeological & Genological Society Kanpur India*, Vol IX, Issue II (I), 2022

### **Abstract:**

In this paper is an attempt to compare e-commerce websites across select product categories on the basis of the information content and features provided. The attributes of the select e-commerce websites are classified into categories and their similarities are measured by creating a Paired Similarity Index (PSI). The comparison will enable to rank websites as per their information content and features provided.

7. Suraj Das, Bipasha Chetiyā Barua and Sanjay Rizal, *Exploring The Role Of Failure In Intrinsic And Extrinsic Motivation– A Dyadic Interface Between Employee And Leader*, *International Journal of Mechanical Engineering*, ISSN:0974-5823, Vol: Vol. 7 No. 2 February, 2022.

### **Abstract:**

Leaders Lead by Example” It is obvious in an organization to reward success and punish failure. Although failure is not welcomed but it’s after effect may bring positive outcomes to an organization; In this study, the researchers have tried to examine the Role of Failure Event as an Intrinsic Motivator as well as the Role of Leadership Approach as an Extrinsic Motivator in relation to employees’ failure in achieving the given target in two renowned Petroleum sectors of India. The findings of the study suggest that Leadership Approach plays extrinsic role in affecting employees’ motivation positively in failure situation whereas Failure Event itself plays intrinsic role in boosting employees’ motivation under a failure situation. Keywords: Leadership Approach, Failure Experience, Motivation.

8. Pinky Gogoi And Barsha Kalita, *Emotional Intelligence Of Educational Leaders: A Study Of Selected College Principals Of Dibrugarh University*, *Shodha Prabha Vol. 47, Issue. 01, No.5: 2022.*

### **Abstract:**

The unbeatable forces of globalization have created the business world a dynamic one uniting countries of various cultures, so as to keep up harmony, unity and peace among these individuals from varied backgrounds the effective management of human resources could be a necessity in any organization. Therefore, the operations of human resource management aren’t restricted to administration, recruiting associate degree coaching however additionally form a worker in accordance with the organization’s culture and elegance of labor hence today’s human resource manager is multitasked. Their job has two sides: management and scientific discipline. The purpose of this study is to look at the impact of emotional intelligence on academic leaders. The major objective of the study is to know the flexibility of awareness of school Principals in



characteristic emotions. The study highlights the capability of academic leaders in characteristic, using, understanding and managing their emotions. The study also will facilitate the academic leaders to determine the precise expectations of the stakeholders of the academic establishments like management, teaching and non-teaching workers students etc. Further, it additionally suggests the academic leaders to handle the emotions showing intelligence to realize leadership goals.

**9. Pinky Gogoi And Anirban Patgiri, *Value Added Tea: A Comparative Study Of India And Japan*, Anvesak , ISSN: 0378 – 4568, Vol. 52, No.1(I) January – June 2022.**

**Abstract:**

The effective functioning of the Tea Industry in India is vital to various stakeholders all around the globe. India is the world's second largest producer of tea after China and the fourth largest tea exporter in the world after China, Kenya and Sri Lanka. However, more than 80% of the tea exported from India are in the form of bulk tea, which fetches the lowest price in the global tea market. India earns an average value of US\$3.58 per kilogram for its tea exports. Japan on the other hand, a highly innovative tea-producing country earns on an average US\$24.24 per kilogram for its tea exports. The absolute volume of tea production and tea export from India is manifold more than that in Japan. Also, the domestic consumption of tea in Japan is relatively more than that in India. Despite such factors, the value secured by the Japanese Tea in the global market is higher than the value fetched by the Indian Tea. This competitive advantage realized by the Japanese tea can be attributed to many factors; and a primary one among those is the marketing of value-added tea products and other tea-based products. The primary objective of this study is to examine the root causes of product and process innovation in Indian tea industry, as compared to Japan, by conducting a historical analysis of literature. Keeping other factors constant, the Indian tea industry should consider promotion of value-added tea for a sustainable export market.

## **Published Book Chapters**

1. Pinky Gogoi And Anirban Patgiri, ***AWARENESS OF NEUROMARKETING AMONG SELECTED INDIGENOUS STARTUPS OF NORTH EAST INDIA***, In: BIZQUEST, 227-237, Editor : SAMRAT BHARADWAJ, Publisher : EUREKA PUBLICATIONS, ISBN: 978-93-91260-76-7.

### **Abstract:**

The traditional methods are fading away with the scientific methods taking a plunge into the field of market research. Neuro marketing is the recent technique in the field of market research that is attracting many eye-balls. It applies neuropsychology to marketing research. Human decision-making is both a conscious and non-conscious process in the brain, and while this method of research succeeded in gathering explicit (or conscious) emotions, the traditional methods failed to gain the consumer's implicit (or unconscious) emotions. Non-conscious information has a large influence in the decision-making process. The goal of the present study is to analyze the Awareness of Neuro marketing as a tool for studying Consumer behavior among the indigenous North- Eastern startups of India. This concept is less known and unexplored not only in Assam but the whole of North-East, yet the startups do not ignore the fact that studying consumer psychology is an important aspect. As Neuromarketing further evolves, we can expect more and more revelation of intricacies involved which determines the consumer's purchasing behavior. The awareness of Neuromarketing is to be studied in order to know its application, success and failure as a tool for studying consumer behavior as this type of studies have an important role for the future of marketing. The study will help the local entrepreneurs and marketers to know about Neuromarketing and upgrade their tools and techniques for studying consumer behavior.

2. Barsha Kalita And Pinky Gogoi, ***ADVANTAGE ASSAM: INDIA'S EXPRESSWAY TO ASEAN WITH REFERENCE TO THE TOURISM SECTOR***, In: HIGHER EDUCATION IN THE 21<sup>ST</sup> CENTURY: ENVISIONING THE FUTURE, 228, Editor DR. ABDUL FOYES MD MALIK AND DR. DIPAK KUMAR DOLEY, Publisher : SUNBEAM, ISBN: 978-93-93092-23-6.

## **Abstract:**

Inviting investors from all over the world, the Government of Assam has conducted for the first time – ‘Advantage Assam – The Global Investors’ Summit 2018’ in Guwahati. The summit aimed at highlighting the state’s geographic advantages offered to investors by Assam. The event showcased the manufacturing process and the opportunities offered by the state in terms of export –oriented manufacturing and services to growing economies viz ASEAN and BBN countries. It is an expressway of India to ASEAN. The summit witnessed luminaries of Indian business fraternity descending on the most talked about investment summit in the largest economy of North Eastern India. The summit witnessed primary focus on sectors such as tourism, textile and handicraft, hospitality and wellness. The study reveals the possibilities of sub regional connectivity with the ASEAN countries through tourism. The Tourism Policy 2017 was one of the major attractive Sectorial Policy. An attempt has been made to study the Tourism Policy 2017 and its benefits as discussed in the summit. It highlights the importance of Tourism Industry for growth of the economy of the North Eastern Region and the country. Research has been carried out by studying the various data and information from the published journals, newspaper, website and records. Geographically, the state is located closer to the growing ASEAN economies and Assam’s existing and ongoing infrastructural initiatives makes it the ideal staging ground for various businesses including tourism aiming to cater to the ASEAN and BBN countries.

**3. Pransu Raj Kaushik, *Transitional Changes in Tea Management – A General Study and Related Suggestions*, Page Nos.: 123-127, Editor: Samrat Bharadwaj, Publishing House: Eureka Publications, ISBN: 978-93-91260-76-7.**

## **Awards and Recognitions received by Faculty Members**

1. **Dr. Seema S Singha** acted as Resource Person for *International conference on Contemporary Issues in Business management (ICCIBM 2022)*, organized by SMIT, Sikkim.

**Number of Participants:** 30

**Number of papers:** 10

## **Awards and Recognition received by group members**

1. **Prathana Chaliha**, Centre for Management Studies,D.U was awarded PhD Degree for her thesis on '*A Study on the Green HRM Practices in the Oil and Natural Gas Limited of Nazira &Sivasagar,Assam Asset.*'. She was working under the supervision of **Dr. Seema S Singha** .