

Education

Indian Institute Of Technology, Guwahati , PhD. in Energy Biorefinery Approach for Bio-waste Valorization (Prof. Vaibhav V. Goud)	2019-2025 GPA 8.50/10
National Institute Of Technology, Rourkela , M.Sc. in Life Science (Zoology) Expression of narG gene and characterization of nitrate reductase from <i>R. rhodochrous</i> CTI-14 (Prof. Surajit Das)	2017-2019 GPA 8.32/10
Gauhati University , B.Sc. in Zoology (With Minor in Botany and Chemistry)	2014-2017 GPA 8.80/10

Technical Experience

PhD Project: Biorefinery Approach for Bio-waste Valorization	Bioenergy Lab	Supervisor: Prof. V. V. Goud <i>July 2019-November 2025</i>
<ul style="list-style-type: none">• Sustainable valorization of passion fruit rind, an agro-industrial waste; aiming for zero waste and enhanced resource utilization.• Optimized extraction of bioactive compounds from passion fruit rind.• Fermentation of the sugar obtained from passion fruit rind for production of bioethanol.		
M. Sc. Project: Denitrification using Rhodococcus sp.	LEnME Lab	Supervisor: Prof. Surajit Das <i>July 2028- April, 2019</i>
<ul style="list-style-type: none">• Studying aerobic denitrification: Primer design, PCR, gel electrophoresis, sequencing, phylogenetic tree, homology search• Studying expression of nitrate reduction (NR) coding gene (narG): RNA isolation, qRT PCR• Studying enzymatic kinetics of nitrate reductase enzyme: Protein isolation, quantification, separation, PAGE, enzyme kinetics		
Laboratory Internship: Pretreatment on sugarcane leaf top	CEBL Lab	Supervisor: Prof. Arun Goyal <i>May- July, 2018</i>
<ul style="list-style-type: none">• Comparing various pretreatment method for production of bioethanol.		

Research Interest

Bioprocess engineering, Biomass conversion technology, and sustainable biomass valorization for developing bio-fuels, bioactive compounds, and industrial bioproducts. Focus on integrating upstream and downstream process optimization, analytical characterization, and circular bioeconomy principles to design efficient and scalable biotechnological solutions.

Publications

- **Kakali Borah**, Vaibhav V Goud, 2025. Bioconversion of spent passion fruit rind to ethanol: Integrating hemi-cellulose hydrolysis and detoxification. *Bioresour. Technol. Reports* 31, 102193. DOI: 10.1016/j.biteb.2025.102193
- **Kakali Borah**, Vaibhav V Goud, 2025. One-Pot Method to Extract Natural Antioxidizing Agents from Passion Fruit Rind to Increase the Oxidative Stability of Sunflower Seed and Soybean Oils, *Food Chemistry*, 144668. DOI: 10.1016/j.foodchem.2025.144668
- **Kakali Borah**, Rupesh Kumar, Sukumar Purohit, Vaibhav V Goud, 2025. Comparative study on phytochemical extraction from Passion fruit wastes using ultrasound and supercritical fluid extraction, *Journal of Food Measurement and Characterization*, 1-13. DOI: 10.1007/s11694-025-03150-8
- Sukumar Purohit, **Kakali Borah**, Vaibhav V Goud, 2025. Unlocking the Potential of Passion Fruit Waste By-Products through Biorefinery and Bioresource Innovation, *Bioresource Technology Reports*, (Submitted)
- **Kakali Borah**, Vaibhav V Goud, 2025. Alkali Delignification and Fermentation of Spent Passion Fruit Rind to Bioethanol Production, *Bioresource Technology*, (Submitted)

- **Kakali Borah**, Rupesh Kumar, Vaibhav V. Goud, 2025. A Sustainable Approach to Passion Fruit Waste Utilisation: Statistical Optimization of Ultrasonic Extraction of Polyphenols. Current Progress in Interdisciplinary Research: Selected Papers of RIC 2024. Springer Nature Singapore, 3. ISBN:978-981-95-1852-4.
- **Kakali Borah**, Vaibhav V Goud, 2024. Sustainable Waste to Energy Technologies: Fermentation. In: Dr. Arbind Prasad and Dr. Atanu Kumar Paul (Eds). Biodegradable Waste Processing for Sustainable Developments, CRC Press 150-172. DOI: 10.1201/9781003502012-7
- **Kakali Borah**, Rupesh Kumar, Vaibhav V Goud, 2023. Extraction of Phenolics from Yellow Passion Fruit Rind Using Supercritical Carbon Dioxide Extraction. Agro and Food Processing Technologies: Proceedings of NERC 2022. Springer Nature Singapore 141-156. DOI: 10.1007/978-981-19-9704-48.

Conferences

- **Kakali Borah**, Vaibhav V. Goud, “Valorizing Agro-Industrial Waste: Bioethanol Production from Delignified Spent Passion Fruit Rind Residue“ 2025 ASSET International Conference on Advances in Sustainable Solutions for Energy Transitions, Indian Institute of Technology Guwahati, Assam, India, 2025.
- **Kakali Borah**, Vaibhav V. Goud, “Valorisation of Passion fruit Rind for the Production of Bioethanol: Statistical Optimisation of Hemicellulose and Fermentation with *Pichia stipitis*“ 2024 SEEP International Conference on Sustainable Energy and Environmental Protection, University of Natural Resources and Life Sciences, Vienna, Austria, 2024.
- **Kakali Borah**, Rupesh Kumar, Vaibhav V. Goud, “A Sustainable Approach to Passion Fruit Waste Utilisation: Statistical Optimization of Ultrasonic Extraction of Polyphenols“ 2024 RIC Research and Industrial Conclave-Integration, IIT Guwahati, India, 2024.
- **Kakali Borah**, Rupesh Kumar, Vaibhav V. Goud, “Optimisation of the techniques used for valorization of Passiflora wastes using RSM“ 2023 ICFTN International Conference on Food Technology And Nutrition, Paris, France, 2023.
- **Kakali Borah**, Vaibhav V. Goud, “Rsm-Based Optimization Of Recovery Of Phenolic Compounds From Passion Fruit Rind Using Ultrasound-Assisted Extraction“ 2023 ICNPU International Conference on Natural Products utilisation: From Plants to Pharmacy Shelf, Sts Constantine and Helena Resort, Bulgaria, 2023.
- **Kakali Borah**, Sukumar Purohit, Vaibhav V. Goud, “In-situ Extraction of Carotenoid from Passion Fruit Peel to Improve Quality of Vegetable Oil” 2021 BREECH International Conference on Biotechnology for Resource Efficiency, Energy, Environment, Chemicals and Health, CSIR-IIP, Dehradun, India, 2021.

Workshops

- **Foundation of Python in Data Science** (March 2024).
- **Implementation of MSME Innovation Scheme-Intellectual Property Right (IPR)** (February 2024).
- **Applied Statistical Modeling and Data Analytics for Petroleum Engineering and Related Applications** (November 2022).
- **Sustainable Energy Utilisation Technology for Green Hydrogen and Renewable Fuels** (October 2022).
- **Python Training for Scientific Computing and Data Science** (April 2022).
- **Intellectual Property Rights for Academic and Research Institutions** (February 2021).

Languages and Technologies

- Basic C; MATLAB; Latex, Python.
- Design Expert; SPSS, MS Office, Mendeley.
- Instrument handled: UV-Vis spectroscopy, FESEM, HPLC, GC-MS, TGA, DSC, Supercritical Fluid Extractor, Soxhlet extraction apparatus, Element analyser, FTIR, HRMS.
- Microbial culture and fermentation, Enzymatic hydrolysis, Antimicrobial assays (MIC, ZOI), Biosafety and aseptic techniques (BSL-2).
- Statistical analysis (ANOVA, RSM, regression).
- Process optimization, Data interpretation and reporting, Interdisciplinary problem-solving.
- Primer design, PCR, gel electrophoresis, sequencing, phylogenetic tree, homology search, RNA isolation, qRT PCR, Protein isolation, quantification, separation, PAGE.

Additional Experience and Achievements

- **Reviewer Certificate (2025):** Manuscript review - Food Chemistry (Elsevier), Food Analytical Methods (Springer Nature).
- **Best Oral Presenter (2024):** In Research and Industrial Conclave-Integration, IIT Guwahati, India.
- **Operator (2021 – 2024):** Certified for FESEM-EDX and CHNS analyser in Central Instrument Facility, IIT Guwahati, India.
- **Instructor (2021 – 2024):** Taught two full-credit Zoology courses (in North Guwahati College); Chemical Engineering courses (in Assam Engineering College); Energy courses (in Assam Science and Technology University).
- **Prime Minister Research Fellow (2020):** Awarded Fellowship for doctoral programme from MoE, GoI.
- **MHRD Fellowship (2019):** Awarded Fellowship for doctoral programme from MoE, GoI.

Involvements

Volunteered: I have actively participated in several volunteer activities in Implementation of MSME Innovation Scheme-Intellectual Property Right (IPR) (2024); G20 summit, IIT Guwahati (2023); BSBB international conference, IIT Guwahati (2022).

Members: I served as a member of Hospitality Team in Research and Industrial Conclave, IIT Guwahati (2022); Hostel Management Committee- Covid Response Team of Subansiri Hostel (2020-2022).