Conference Report

"Recent Advances in Bioreactor Design and Operations for Bioprocess Intensification"

26–28 March 2025

Department of Biotechnology, Koneru Lakshmaiah Education Foundation

The Department of Biotechnology, Koneru Lakshmaiah Education Foundation, successfully organized a three-day conference titled *"Recent Advances in Bioreactor Design and Operations for Bioprocess Intensification"* from 26th to 28th March 2025. The event brought together researchers, academicians, industry experts, and students to discuss emerging trends, technological innovations, and practical challenges in modern bioreactor systems and intensified bioprocessing strategies.

Inaugural Session

The conference commenced with a welcome address by the department, highlighting the importance of bioprocess intensification in improving productivity, sustainability, and cost-effectiveness in biotechnology industries. The session emphasized the growing need for advanced bioreactor technologies in pharmaceuticals, industrial enzymes, biofuels, and microbial production platforms.

Keynote Speakers and Their Contributions

Dr. Salavadi Easwaran *Dean, Biocon Academy*

Dr. Easwaran delivered an insightful talk on industrial-scale bioreactor operations and the evolving expectations of the biopharmaceutical sector. His session focused on:

- Challenges in scaling up mammalian cell culture bioreactors
- Quality-by-Design (QbD) approaches in bioprocessing
- Role of automation, single-use technologies, and digital twins in modern biomanufacturing

  He stressed the relevance of skill development and industry-ready training for biotechnology graduates.

2. Dr. Pritam Dikshit

National Institute of Technology, Jalandhar

Dr. Dikshit presented recent advancements in bioreactor modeling and computational optimization. His talk covered:

- Mathematical modeling and simulation of bioreactors
- Impact of hydrodynamics on microbial and enzymatic processes
- Use of AI/ML tools in predictive bioprocess control

His session provided a strong research-oriented perspective, encouraging participants to integrate computational tools into experimental workflows.

3. Dr. Sarada Prasanna Mallick

National Institute of Technology, Andhra Pradesh

Dr. Mallick discussed innovative bioreactor configurations and strategies for process intensification. Key points from his lecture included:

- Novel reactor designs such as airlift, perfusion reactors, and packed-bed systems
- Process intensification through continuous bioprocessing

- Sustainability aspects and energy-efficient reactor operations He highlighted the need for eco-friendly process integration for future industrial biotechnology.

Technical Sessions & Student Engagement

Across three days, the conference featured multiple technical sessions, oral presentations, and interactive discussions. Research scholars and postgraduate students presented their work on topics including:

- Enzyme production processes
- Bioreactor monitoring and control
- Fermentation optimization
- Bio-based product development
- Waste-to-value bioprocesses

Posters and presentations encouraged active academic engagement and constructive feedback from invited experts.

Outcomes of the Conference

The conference succeeded in:

- Providing a platform for knowledge exchange between academia and industry
- Enhancing understanding of next-generation bioreactor technologies
- Encouraging interdisciplinary research in bioprocess intensification
- Inspiring young researchers to explore advanced bioprocess optimization strategies

Conclusion

The three-day event concluded with a vote of thanks, acknowledging the efforts of the organizing committee, invited speakers, faculty members, and student volunteers. The conference significantly contributed to strengthening the research culture within the department and reinforced its commitment to promoting advancements in biotechnology.