

PALLAVI GULIPALLI, Ph.D

Lignocellulose Biomass | Nanocellulose & Packaging | Sustainable materials & Polymer Composites

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Research Profile:

PhD in Chemical Engineering with expertise in nanocellulose processing, lignocellulosic biomass valorization, and sustainable materials. Experienced in cellulose nanofiber (CNF) production using ultrafine grinding (Super Masscolloider), pulp refining, and fabrication of nanocellulose-based membranes and barrier coatings. Skilled in material characterization (SEM, XRD, FTIR, TGA, DSC) and development of sustainable packaging and filtration materials. Interested in translating biomass-derived materials into scalable industrial applications.

Research Experience:

Thesis: Characterization of nanocellulose fibers and sheets processed using Ultrafine grinding

Specialised in nanocellulose production and characterization, with in-depth expertise in Super Masscolloider (SMC) for the preparation of cellulose nanofibers (CNF). Skilled in processing bleached and unbleached pulps to produce CNF with high fibrillation efficiency and desirable surface properties for functional applications. Skilled in the fabrication and characterization of CNF-based fibers/sheets as barrier coatings for sustainable packaging. Developed CNF films and coatings with enhanced oxygen barrier performance, mechanical strength, thermal stability, and surface porosity, demonstrating potential as biodegradable alternatives to synthetic polymer coatings. Experienced in application-driven testing, including tensile, burst, porosity, air permeability, and biodegradability analyses. Applied CNF to environmental solutions (PM2.5/PM10 capture membranes) and packaging innovations (biodegradable coatings and nanocellulose-reinforced composites). Demonstrated ability to integrate CNF with polymers and epoxies using hand lay-up and vacuum bagging techniques, bridging the gap between lab-scale nanocellulose production and real-world applications in packaging and environmental sustainability.

Research Achievements:

- Designed CNF-based coatings demonstrating enhanced barrier performance for packaging.
- Developed porous nanocellulose membranes capable of capturing PM_{2.5} particulates.
- Developed natural fiber filled epoxy sheets for partially biodegradable packaging applications.
- Published in peer-reviewed journals and presented at international conferences.

Education:

Ph.D. in Chemical Engineering,	Dec 2020 – Nov 2025
Birla Institute of Technology and Science-Pilani, Hyderabad campus	Hyderabad, TN.
M.Tech in Computer Aided Chemical Engineering	2018 - 2020
Andhra University (AU)	Visakhapatnam, AP
B. Tech in Chemical Engineering	2013 - 2017
Rajiv Gandhi University of Knowledge Technologies (RGUKT)	IIIT-Nuzvid, AP

Awards

- ❖ *Senior Research Fellowship (Direct-SRF: Ph.D. - May 2024 to Present) by Council of Scientific and Industrial Research, Human Resource Development group (CSIR-HRDG), Government of India.*
- ❖ **Best Paper Award** (Runners-up) by the Indian Pulp and Paper Technical Association (March 2023)
- ❖ **Institute Fellowship** by BITS-Hyderabad Campus. (Ph. D – Dec, 2020 to April, 2024).
- ❖ **Merit scholarship** to pursue M. Tech at Andhra University.
- ❖ **Merit scholarship** to pursue PUC+ B. Tech (6-year Integrated course) at RGUKT- AP IIIT, NUZVID)
- ❖ **Prathiba Award** for merit in SSC board exams.
- ❖ District and state-level prizes in **Science Day** at VZM, & Hyderabad.

Skills

- **Key Research Expertise**
 - ✓ Lignocellulosic biomass processing and pulp refining
 - ✓ Nanocellulose (CNF) production using an ultrafine grinder
 - ✓ Sustainable packaging materials and barrier coatings
 - ✓ Nanocellulose membranes for PM_{2.5}/PM₁₀ filtration
 - ✓ Polymer composites and epoxy-based materials
 - ✓ Mechanical, thermal, and structural characterization
- **Analytical:**
 - ✓ Scanning Electron Microscopy (SEM)
 - ✓ Energy Dispersive X-ray Analysis (EDX)
 - ✓ X-ray Diffraction Analysis (XRD)
 - ✓ Fourier Transform Infrared Spectroscopy (FTIR)
 - ✓ X-ray Fluorescence Analysis (XRF)
 - ✓ Thermo Gravimetric Analysis (TGA)
 - ✓ Differential Scanning Calorimetry (DSC)
- **Software:** Origin, ImageJ, MS Office, Minitab.
- **Soft Skills:** Project Management, Teamwork, Technical Writing, Problem-Solving

List of Publications: [PALLAVI GULIPALLI - Google Scholar](#)

1. **Pallavi Gulipalli***, Chandra Babu Mallineni, Ramesh Babu Adusumalli, Ramendra Kishor Pal. Mechanical Properties of Micro/Nanocellulose-Filled Epoxy Sheets at Subzero and Elevated Temperatures. *ACS Omega*. 2025, 10(51),63102-63116. (*Corresponding Author*)
2. **Pallavi Gulipalli**, Chandra Babu Mallineni, Trinath Jamma, Ramesh Adusumalli. Entrapment of PM_{2.5} and PM₁₀ dust particles using bleached nanocellulose-based filters processed via ultrafine grinding. *Cellulose*, 2025, 32:1729-1753 (SCOPUS Indexed, IF=4.9).
3. Ipsita Sahoo, **Pallavi Gulipalli**, Kaushik Chivukula, Ramesh Adusumalli. Processing and Characterization of Micro and Nanocellulose Fibers Produced by Lab Valley Beater (LVB) and Super Masscolloider (SMC). *Cellulose Chemistry and Technology*, 2023, 57 (7-8):759–774 (SCOPUS Indexed, IF=1.3). (*First Author*: Equal contribution)
4. **Pallavi Gulipalli**, Sujay Borle, Kaushik Chivukula, Ramesh Babu Adusumalli. Processing of nanocellulose sheet for capturing fine particulate matter. *Materials Today Proceedings*, 2022, ISSN 2214-7853, (SCOPUS Indexed, SJR Value: 0.4)
5. **Pallavi Gulipalli**, Varsha Viswanathan, Chandra Babu M, Ramesh Adusumalli. Processing of packaging material using recycled fibers and unbleached subabul sapwood pulp through Nanotechnology. *IPPTA (Indian Pulp and Paper Technology Association) - The Official International Journal*, 2023 35(1); 149-155 (ISSN: 0379-5462). SJR Value: 0.1.
6. Mohammed Mushtaq, **Pallavi Gulipalli**, Ramesh Adusumalli, Kurra Suresh, Anu Anna Abraham. Effect of 200 days of cyclic weathering and salt spray on the performance of PU coating applied on composite substrate. *Science and Engineering of Composite Materials*. 2025, 32, 1-18. (Scopus indexed, SJR Value: 0.35). <https://doi.org/10.1515/secm-2025-0055>
7. Ramesh Adusumalli, Chandra Babu Mallineni, Pallavi Gulipalli, Mohammed Mushtaq, Padma Bonavath, Anu Anna Abraham. Effect of 100 Days of Hot-Wet Conditioning on Mechanical Properties of PU-Coated Polymer Composites. *Journal of Engineering Materials and Technology*. (Scopus Indexed, Accepted: 6 Aug 2025)
8. **Pallavi Gulipalli**, Tanusha Punugoti, P. Nikhil, Venkat Rao Poiba, Meena Vangalapati. Synthesis and characterization of Ni/Zn dually doped on multiwalled carbon nanotubes and its application for the degradation of dicofol. *Materials Today Proceedings*, 2021, 44, 2760-2766. (SCOPUS Indexed, SJR Value: 0.58)
9. N. Sasikala Reddy, N. Lokeswara Reddy, S. Monica Nissy, **G. Pallavi**, Meena Vangalapati. Degradation of dicofol by synthesized ZnO nanoparticles as catalyst. *Materials Today Proceedings*, 2020, 26, 1694-1700. (SCOPUS Indexed, SJR Value: 0.58)

Book Chapters:

1. **Pallavi Gulipalli**, Chandra Babu M, Ramesh Adusumalli, Ramendra Kishore Pal, Tejasvi K. Biodegradability studies of Micro/Nanocellulose filled epoxy sheets. *Springer Proceedings in Physics. Accepted*: (Scopus Indexed, Accepted: 11 Aug 2025)
2. Chandra Babu Mallineni, **Pallavi Gulipalli**, Aditya Nema, P K Penumakala, Dedeeppya Alla, Tejasvi K, Ramesh Adusumalli. Curing kinetics, thermal and physical properties of epoxy resins and carbon fibre-epoxy composites at sub-zero and elevated temperatures. Book Chapter: *Chapter 8, Spri. Proceed. in Materials, Vol. 77, S. A. Singh et al. (Eds): Novel Materials and Technologies for Energy and Environment Applications, Volume 1*, Scopus indexed (ISBN: 978-981-96-6106-0). http://dx.doi.org/10.1007/978-981-96-6107-7_8

List of Conferences and Symposia:

- 1 *Biodegradability studies of micro/nanocellulose-filled epoxy sheets*, 1st International Conference and Exhibition on Advanced Materials and Structures (ICEAMS-2025), **Oral presentation**, organized by ISAMPE, DRDO & IIT Hyderabad, 2-5th July 2025.
- 2 National Conference on Recent Advances in Composites (NCRAC 2024), Composites for next-level applications, **Attendee**, Organized by TECMA, Hyderabad, 8-9th November 2024.
- 3 *Curing kinetics, Thermal and Physical Properties of Epoxy resins and Carbon fibre-epoxy Composites at Subzero and Elevated Temperatures*, 2nd International Conference on Novel Materials and Technologies for Energy Applications (NMTEEA 2024), **Oral presentation**, organized by Chemical Engineering Department, BITS Pilani, Hyderabad Campus, 17-18th February 2024.
- 4 Replacing single-use Plastic by Paper with Emphasis on Food Packaging, **Attendee**, IPPTA Workshop cum Seminar, CSIR-CFTRI, Mysuru, 3-4th August 2023.
- 5 *Production of Packaging Material using Recycled Fibers and Unbleached Subabul Sapwood Pulp Through Nanotechnology*, **Received best oral presentation award**, IPPTA Workshop cum Seminar - Preparing Paper Industry towards Green Manufacturing, Hyderabad, 17-18th March 2023.
- 6 *Synthesis of nanocellulose fibers using ultrafine grinding*, **Poster presentation**, National Symposium on Convergence of Chemistry & Materials (CCM 2023), Organized by Department of Chemistry, BITS Pilani-Hyderabad Campus, 6-7th January 2023.
- 7 *Processing of nanocellulose sheet for capturing fine particulate matter*, **Oral presentation**, Novel Materials and Technologies for Energy Applications (NMTEEA 2022: Online Mode), organized by the Chemical Engineering Department, BITS Pilani-Hyderabad Campus, 18- 19th February 2022.