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Notice for the PhD Viva Voce Examination

Mr Adhithya Sankar S, Registration Number: 2270115, PhD Scholar at the Department of Life Sciences, School of Sciences, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Tuesday, 07 April 2026 at 11.30 am in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Food Waste Valorisation through Biopolymer Production and its Potential Applications**
Discipline	:	**Biotechnology**
External Examiner - I	:	**Dr Y L Ramachandra** Professor Department of Biotechnology and Bioinformatics Kuvempu University Jnanasahyadri Shankaraghatta - 577451 Shimoga district Karnataka
External Examiner - II	:	**Dr D Muralidhara Rao** Professor Department of Biotechnology Sri Krishnadevaraya University Anantapur - 515003 Andhra Pradesh
Supervisor	:	**Dr Mridul Umesh** Assistant Professor Department of Life Sciences School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva–voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 23 March 2026

ABSTRACT

Food waste is the largest component of global biowaste, creating serious environmental challenges. Converting this waste into value-added products such as biopolymers offers a sustainable solution. This study investigated the production of cellulose, chitosan, and gelatin using food waste substrates. Cellulose was extracted from wood apple shell, cabbage peel, and chilli stalks, with wood apple shell yielding the highest amount (36.95% w/w) and purity (81.70% w/w). Gelatin extracted from Labeo rohita fish waste showed a yield of 19.38% (w/w). Chitosan produced from Aspergillus versicolor (AD07) grown on wild jackfruit waste medium yielded 178.40 mg/L. The biopolymers were characterized using FTIR, XRD, TGA, DSC, and SEM. Process optimization through Box–Behnken design enhanced yields by 1.06- fold (cellulose), 1.08-fold (gelatin), and 6.4-fold (chitosan). Biopolymer sheets incorporating 1% lemongrass oil were fabricated and tested. The sheets showed good mechanical strength, antimicrobial activity against Bacillus megaterium and Escherichia coli, and high biodegradability compared to conventional plastics. Shelf-life studies on paneer demonstrated reduced microbial growth in wrapped samples. This work highlights an integrated approach for food waste valorization and supports biopolymers as sustainable alternatives for food packaging applications.

Keywords: *Food waste, biopolymer, cellulose, gelatin, chitosan, biopolymer sheet, biodegradation, shelf-life extension.*

Publications:

1. **Adhithya Sankar Santhosh**, and Mridul Umesh. "Harnessing Wild Jackfruit Extract for Chitosan Production by Aspergillus versicolor AD07: Application in Antibacterial Biodegradable Sheets." Applied Microbiology 5, no. 3 (2025): 71. https://doi.org/10.3390/applmicrobiol5030071
2. **Adhithya Sankar Santhosh**, and Mridul Umesh. "Valorization of waste chilli stalks (Capsicum annuum) as a sustainable substrate for cellulose extraction: insights into its thermomechanical, film forming and biodegradation properties." Biomass Conversion and Biorefinery (2024): 1-14. https://doi.org/10.1007/s13399-024-05370-2
3. Umesh Mridul, **Adhithya Sankar S**, Sreehari Suresh. "Preparation of cellulose based biodegradable sheet using cabbage waste" Patent no: 202441072395