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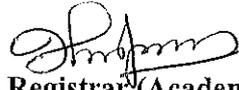
## Notice for the PhD Viva Voce Examination

Ms Liya Merin Stanly, Registration Number: 2071605, PhD Scholar at the Department of Life Sciences, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Monday, 09 March 2026 at 10.30 am in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

- Title of the Thesis** : **Bioconversion of Chicken Feather Waste into Liquid Manure Using Keratinolytic Bacteria and its Application Studies**
- Discipline** : **Biotechnology**
- External Examiner - I** : **Dr Reya Issac**  
Associate Professor  
Department of Biotechnology  
Karunya Institute of Technology and Sciences  
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Coimbatore - 641114  
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- External Examiner - II** : **Dr Kokkanti Mallikarjuna**  
Professor  
Department of Botany and Microbiology  
ANU College of Sciences  
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Andhra Pradesh
- Supervisor** : **Dr Mridul Umesh**  
Assistant Professor  
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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.

**Place:** Bengaluru  
**Date:** 18 February 2026

  
Registrar (Academics)

## ABSTRACT

While wastes are commonly tackled by the 'reduce, reuse and recycle' concept, a recent concept called 'redemption' of waste is the new call of modern research. Conventional methods of waste management including landfilling, incineration or even chemical treatments are not ideal strategies and often create secondary pollution from the by-products and end-products of such processes. Scientific way to approach this problem involves bioprocessing of the waste with the help of microbes, making the process eco-friendly and sustainable. The current research centers on the idea of managing chicken feather waste, one of the most common wastes generated from poultry industry, in a sustainable way by channeling the potential of microbial enzymes to naturally degrade the chicken feathers thereby reducing the load of feather waste. Microbial degradation of feathers breaks down the keratin protein, solubilizing the amino acids and peptides into a liquid form termed as feather hydrolysate (FH). Keeping this as the research aim, a keratinolytic bacteria was isolated from poultry waste dumping soil collected from Russell Market, Shivaji Nagar, Bangalore, Karnataka, India. Through microscopic, biochemical and molecular studies, the isolated strain was identified as *Bacillus tropicus* (accession number OM108144). Culture conditions for the maximum production of enzyme as well as maximum feather degradation was optimized. An enzyme activity of about  $437.47 \pm 0.05$  U/mL that corresponds to a feather degradation of  $57.60 \pm 0.04$  % was achieved at optimized levels of NaCl (0.55 g/L), pH (7.35), inoculum level (5% (v/v)) and incubation period (84 h). Further, FTIR analysis of the hydrolyzed chicken feather revealed stretching and breaking of bonds representing feather degradation which was confirmed through SEM imaging. HPLC analysis of the compositional make-up of the FH revealed the presence of beneficial amino acids, some of which contributed to the antioxidant property of the FH. Parallely, the keratinolytic bacterial strain was also identified to be a plant growth promoting bacteria which showcased considerable resistance to heavy metals as well. Application of the FH as liquid manure via soil amendment, foliar spray and hydroponic nutrient solution, stimulated the growth of Spinach plant (Arka anupama variety) including root and shoot length which was mathematically evaluated and statistically confirmed.

**Keywords:** *Bacillus sp.*, Waste utilization, Plant growth, Chicken feather; Keratin, Hydroponics.

### Publications:

1. Liya Merin Stanly, and Mridul Umesh. "Bioconversion of chicken feather waste into feather hydrolysate by multifaceted keratinolytic *Bacillus tropicus* LS27 and new insights into its antioxidant and plant growth-promoting properties." *Biomass conversion and biorefinery* (2023): 1-11.
2. Liya Merin Stanly, and Mridul Umesh. "Effect of Chicken Feather Hydrolysate on Growth of Spinach through Soil Amendment Method: Unraveling A Potential Liquid Biofertilizer." *Journal of Pure & Applied Microbiology* 18, no. 3 (2024).