



Notice for the PhD Viva-Voce Examination

Ms Sneha Grigary, Registration Number: 2071806, 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, 10 November 2025 at 11.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru – 560029, Karnataka, India.

Title of the Thesis	: Polyhydroxyalkanoate Production from Marine Bacteria: Optimization Strategies and Application Studies
Discipline	: Zoology
External Examiner - I	: Dr Gireesh Babu K Professor and Head Department of Life Sciences Parul Institute of Applied Sciences Parul University Waghodia - 391760 Gujarat
External Examiner - II	: Dr S Vijayakumar Associate Professor PG and Research Department of Botany A.V.V.M. Sri Pushpam College (Autonomous) Poondi – 613 503, Thanjavur District Tamil Nadu
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.

Place: Bengaluru
Date: 31 October 2025

Registrar (Academics)

ABSTRACT

Polyhydroxyalkanoates are defined as a type of natural biodegradable polymers that can be synthesized by many microorganisms. In this study, PHA producing bacteria were isolated from marine water samples collected from Calicut region of Kerala through serial dilution followed by Nile blue and Sudan black staining. 3 PHA producing isolates designated as SG1, TS1, SG2 were further subjected to quantitative screening for PHA production using M9 minimal media. After the quantitative screening, 2 strains namely isolate SG1 (0.67 g/L) and isolate TS1(0.52 g/L) that produced highest PHA yield were selected for further studies. The isolates SG1 and TS1 were identified to be *Bacillus subtilis* and *Bacillus cereus* respectively through biochemical test and 16srRNA sequencing. The effect of bioprocess parameters on PHA production was assessed using one factor at a time (OFAT) approach. The interaction effects of most influential parameters (NaCl concentration, carbon source, nitrogen source and incubation period) on PHA production was evaluated using central composite design (CCD) based two level, two-factor interaction (2FI), factorial model to optimize PHA production. Further the effect of a cost effective and abundantly available carbon source (flower waste) supplementation on enhancing PHA was assessed using floral waste hydrolysate prepared through enzymatic hydrolysis method. The effect of various extraction methods for enhancing PHA recovery was studied using different types of solvents, acids and alkali under varying time interval and temperature range. The extracted PHA was characterized using analytical techniques such as FTIR, NMR, XRD, DSC, and TGA. The extracted biopolymer was utilized for various application studies including anticancer activity testing, wound healing, pathogen challenge, and its application in aquaculture. The results of these studies implied that the extracted PHA has significant when added to the formulated feed can improve the growth performance in fishes.

Keywords: *Polyhydroxyalkanoates, Bacillus spp., flower waste media, aquaculture, wound healing, anti-cancer activity*

Publications:

1. S. Grigary and M. Umesh, "Floral waste as a potential feedstock for polyhydroxyalkanoate production using halotolerant *Bacillus cereus* TS1: optimization and characterization studies," *Biomass Conversion and Biorefinery*, Oct. 2023, doi: <https://doi.org/10.1007/s13399-023-05003-0>.
2. S. Grigary, M. Umesh, and V. M. Mani, "Isolation and characterization of polyhydroxyalkanoate producing halotolerant *Bacillus subtilis* SG1 using marine water samples collected from Calicut coast, Kerala," *Journal of Applied Biology & Biotechnology*, vol. 12, no. 2, 2024, doi: <https://doi.org/10.7324/jabb.2024.143107>.