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Notice for the PhD Viva Voce Examination

Ms G R Jhanani, Registration Number: 2190039, 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 Saturday, 13 December 2025 at 10.30 am in Room No. 628, 6th Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis : **Bioactive Potential of Selected Fruit Peels and its Effect on Growth, Digestibility, and Immuno-Oxidative Response in *Macrobrachium Rosenbergii* (De Man, 1879)**

Discipline : **Zoology**

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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.

Registrar (Academics)

Place: Bengaluru
Date: 04 December 2025

ABSTRACT

The increasing global consumption of fruits has resulted in considerable peel waste, despite their richness in valuable bioactive compounds. Simultaneously, the need for sustainable aquaculture has promoted the search for eco-friendly feed additives that enhance growth, immunity, and stress resistance. This study evaluates the nutritional, biochemical, and functional properties of fruit peels from Carica papaya, Selenicereus costaricensis, Ananas comosus, Musa acuminata, and Punica granatum for their potential as aquafeed ingredients in Macrobrachium rosenbergii. Peels collected at defined ripening stages based on ethylene emission were analyzed for elemental content, phytochemicals, antioxidant activity, proteolytic and antimicrobial properties, and functional traits. P. granatum peel showed the highest total phenolics (246.09 ± 0.25 mg/g), flavonoids (158.27 ± 1.72 mg/g), tannins (103.94 ± 0.09 mg/g), and DPPH radical scavenging activity (129.43 ± 1.34%). A. comosus had the highest vitamin C (95.53 ± 3.52 mg/g). Proteases from P. granatum displayed the highest Vmax (8.45 µmol/min/mL) and broad substrate specificity. It also showed strong antimicrobial activity against A. hydrophila (MIC = 6.25 mg/mL), S. aureus, and P. aeruginosa. M. acuminata peels exhibited superior functional properties, with high water (5.30 ± 0.10 mL/g) and oil absorption, and porosity (71.15 ± 2.22%). A 60-day feeding trial using P. granatum protease at 0.02X–0.1X concentrations revealed significant improvements in growth and health parameters. The P5 group showed the highest specific growth rate (2.14 ± 0.03%) and lowest feed efficiency ratio (0.39 ± 0.01), while P4 had the highest protein (240.01 ± 0.91 mg/g) and amino acid content (148.16 ± 0.83 mg/g). Antioxidant enzymes were elevated in P5, including SOD (43.31 ± 0.33%), CAT (1.91 ± 0.05 U/min/mg), GST (1.43 ± 0.01 U/min/mg protein), GPx (5.97 ± 0.02 U/min/mg protein), and total hemocyte count (22.80 ± 0.05 ×106 cells/mL). Post-challenge with A. hydrophila, mortality dropped to 16.25 ± 1.77% in P5 compared to 71.25 ± 1.77% in control. These results highlight P. granatum peel protease, particularly at 0.08X (P4), and 0.1X (P5) concentrations, as a sustainable aquafeed additive for improving growth, immunity, and disease resistance in M. rosenbergii.

Keywords: *Macrobrachium rosenbergii, fruit peel valorization, growth performance, antioxidant defense, Aeromonas hydrophila, sustainable aquaculture.*

Publications:

1. **J. Gopalraaj** and K. Velayudhannair, “A Comparative Study of Nutrient Composition, Proteolytic Activity, Phytochemical Profiles, Vitamin C Content, and Antioxidant Properties in the Peels of Selected Perennial Fruits,” Agri. Res., Oct. 2024, doi: 10.1007/s40003-024-00798-4.
2. **J. Gopalraaj** and K. Velayudhannair, “Antimicrobial potential of selected fruit peel extracts against multidrug-resistant bacteria: An eco-friendly approach,” J. Appl. Nat. Sci., vol. 17, no. 1, pp. 152-161, 2025, doi: 10.31018/jans.v17i1.6197.
3. **J. Gopalraaj** and K. Velayudhannair, “Eco-friendly valorization of fruit peels: Physicochemical and functional characterization for feed industry applications,” Food Sci. Appl. Biotechnol., vol. 8, no. 1, p. 37, Mar. 2025, doi: 10.30721/fsab2025.v8.i1.443.