



**CHRIST**  
(DEEMED TO BE UNIVERSITY)  
BANGALORE · INDIA

## Notice for the PhD Viva Voce Examination

Ms Riya Ann Samuel (Registration Number: 2071803), PhD Scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore Central Campus will defend her PhD thesis at the public viva-voce examination on Friday, 21 March 2025 at 11.30 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

<b>Title of the Thesis</b>	:	<b>Evaluation of Fermented Offal Waste as a Potential Aqua Feed in Modern Day Aquacultural Practice</b>
<b>Discipline</b>	:	<b>Zoology</b>
<b>External Examiner - I</b>	:	<b>Dr Natarajan Velmurugan</b> Scientist CSIR-NEIST Branch Laboratory, Itanagar G-Sector, Naharlagun -791110, Arunachal Pradesh
<b>External Examiner - II</b>	:	<b>Dr Dineshram R</b> Senior Scientist Biological Oceanography Department National Institute of Oceanography Dona Paula - 403004, Goa
<b>Supervisor</b>	:	<b>Dr Paari K A</b> 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:** 12 March 2025

**Registrar (Academics)**

## ABSTRACT

The isolation and identification of novel probiotic bacteria have gained considerable attention for their potential to catalyse a broad spectrum of biological innovations, ranging from advancements in nutraceutical development to providing alternatives to antibiotics and enhancing immunostimulatory responses. Probiotics are well-known for their ability to produce and stimulate enzymatic activity; in this study, we focus on optimizing enzyme release from selected probiotic strains for diverse applications. To achieve this, we employed a fermentation-based approach to enhance probiotic bioactive compounds within feed ingredients, aiming to replace antibiotic-based feeds effectively. Study also emphasized to achieve this target by utilizing Offal wastes as an alternative ingredient sources contributing the development of sustainable methods. Solid-state fermentation (SSF), emerges as a promising method for utilizing agro-industrial and offal waste in aqua feed production. SSF releases essential nutrients and bioactive substances from offal waste, thereby enhancing feed nutritional profiles.

The present study aimed to develop a mathematical model using response surface methodology (RSM) within statistical software. The quadratic models facilitated the breakdown of complex proteins into simpler proteins and subsequently into amino acids, thereby enhancing nutrient availability. Another model was designed to address the amelioration of antinutritional factors through an enzyme-optimized fermentation process. We investigate the potential of these fermented feeds in aquaculture, addressing issues like indigestibility and imbalanced amino acids. The study explores the utilization of fermented products to enhance somatic growth, antioxidant enzyme activity, and digestive enzyme activity in *Catla catla*.

**Keyword:** *Antioxidant enzymes, Aquafeed, Extracellular Enzymes, Fermentation, Probiotics*

### Publications:

1. Formulation and Characterization of Plant, Animal, and Probiotic Based Fish Meals and Evaluating their Efficacy on Growth and Performance in zebrafish (*Danio rerio*). **Riya Ann Samuel**, Sashmitha dash Riyaz Ali, Kuppusamy Alagesan Paari, *Advances in animal veterinary sciences*. <http://dx.doi.org/10.17582/journal.aavs/2021/9.9.1489.1497>
2. *Bacillus cereus*-mediated bio fermentation of Sardine offal waste: A novel approach to enhance nutritional value by Response Surface Methodology optimization. **Riya Ann Samuel**, Kuppusamy Alagesan Paari. *Journal of applied and natural sciences* <https://doi.org/10.31018/jans.v16i1.5264>