



**CHRIST**  
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## Notice for the PhD Viva Voce Examination

Mr Koushik Koujalagi, Registration Number: 2071608, 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 Monday, 23 February 2026 at 2.30 pm in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

**Title of the Thesis** : **Development of a Synbiotic Formulation as a Preventive Healthcare Solution for Liver Health**

**Discipline** : **Biotechnology**

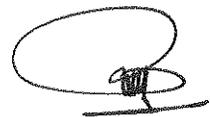
**External Examiner - I** : **Dr G Vijaya Ananda Kumar Babu**  
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**External Examiner - II** : **Dr Vedamurthy**  
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**Supervisor** : **Dr Alok Kumar Malaviya**  
Associate Professor (Former)  
Department of Life Sciences  
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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:** 16 February 2026



**Registrar**

## ABSTRACT

Probiotics producing bile salt hydrolase (BSH) facilitate cholesterol assimilation through de novo synthesis. Among 513 isolates screened, 23 exhibited BSH activity, of which five were prioritized using *Lactobacillus acidophilus* and *Enterococcus lactis* as positive controls. Safety assessment through Gram staining, hemolytic, gelatinase, and catalase assays (ICMR–DBT guidelines) identified *Enterococcus faecalis* CGz3 and CGz4 as  $\gamma$ -hemolytic, catalase-negative, and gelatinase-negative, with CGz3 advancing for characterization. This included evaluation of cell surface hydrophobicity, autoaggregation, lysozyme resistance, and tolerance to gastric acidity, bile salts, and simulated digestive fluids. Substrate utilization assays standardized BSH quantification, with maximal activity at 16 h using 0.1% sodium glycocholate (GCA). Factorial optimization demonstrated highest activity at pH 5.5, 1% inoculum, 40 °C, and 200 RPM. Prebiotic optimization using response surface methodology and single-variable analysis tested dandelion root extract, fructooligosaccharides, maltitol, sorbitol, and inulin. The optimized mix (0.4 mg/ml sorbitol, 0.2 mg/ml maltitol, 0.5 mg/ml dandelion root extract) achieved BSH activity of 182.5 mg/ml, validating Box-Behnken design. Extracts prepared via Soxhlet (80 °C) were partially characterized by carbohydrate, phenolic, and antioxidant assays, HPLC quantification of chlorogenic acid, and GCMS profiling of 25 compounds. In HepG2 steatosis models induced by cholesterol and oleic acid, CGz3 reduced lipid accumulation, downregulated lipogenic genes (SREBP-1c, FAS, ACC), suppressed inflammatory mediators (TNF- $\alpha$ , IL-6, CRP, TLR4, TLR9, NF- $\kappa$ B, JNK, ERK), and upregulated PPAR- $\alpha$  and AMPK. Collectively, results support *E. faecalis* CGz3 as a candidate synbiotic with nutraceutical potential for managing hypercholesterolemia and NAFLD.

**Keywords:** *Bile salt hydrolase, Cholic acid, cholesterol assimilation, HepG2 cell-lines, non-alcoholic fatty liver disease (NAFLD), probiotics, and prebiotics.*

### Publications:

1. **Koushik Koujalagi**, Krishna, Kondapalli Vamsi, Rutwick U. Surya, M. P. Namratha, and Alok Malaviya. “Enterococcus species and their probiotic potential: Current status and future prospects” *Journal of Applied Biology & Biotechnology* 11, no. 1 (2022): 36-44.
2. **Koushik Koujalagi**, Krishna Kondapalli Vamsi, Sompalli Bhavana, and Alok Malaviya. “Biofuels From Bio-Waste and Biomass” In *Biomass and Bioenergy Solutions for Climate Change Mitigation and Sustainability*, pp. 75-118. IGI Global, 2023.
3. **Koushik Koujalagi**, Malviya Alok. Screening, isolation, characterization and optimization of BSH activity from potential probiotic isolates from various sources, *Journal of Applied Biology and Biotechnology*, Vol 13, Issue 4.100.
4. **Koushik Koujalagi**, Malviya Alok. *Enterococcus faecalis* CGz3 alleviates steatosis via BSH-mediated modulation in HepG2 cell-lines, *Research Journal of Biotechnology*.