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Notice for the PhD Viva Voce Examination

Mr Shashank A S, Registration Number: 2071804, 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 Thursday, 19 February 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** : **Studies on the Seasonal Variation of Heavy Metals in Halasuru and Agara Lakes of Bengaluru and their Impact on *Oreochromis niloticus* L.**
- Discipline** : **Zoology**
- External Examiner - I** : **Dr Suba G A Manuel**
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- External Examiner - II** : **Dr M P Bhilave**
Professor
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- Supervisor** : **Dr Krishnakumar V**
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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: 10 February 2026


Registrar

ABSTRACT

The present study examined the seasonal variation and impact of heavy metal (HM) contamination in Halasuru and Agara lakes of Bengaluru, emphasizing environmental and human health perspectives. Water, sediment, and fish (*Oreochromis niloticus*) samples collected from August 2021 to July 2023 revealed that HM concentrations in both lakes exceeded permissible limits prescribed by various organizations. Bioaccumulation of Cd, Cu, Zn, Cr, and Pb in gill, muscle, kidney, liver, and gonad tissues of *O. niloticus* also surpassed regulatory thresholds. Sediment and edible tissue (muscle) concentrations were used to evaluate ecological and human health risks. Elevated contamination factor (CF), pollution load index (PLI), Geoaccumulation index (Igeo), and environmental risk index (ERI) values were recorded, particularly during the monsoon season, with Agara Lake showing marked enrichment in Zn and Cr. Estimated daily intake (EDI), target hazard quotient (THQ), hazard index (HI), and target carcinogenic risk (TR) values for Cd, Cr, and Pb exceeded safe limits, indicating potential health risks from fish consumption. Laboratory exposures of *O. niloticus* to individual and combined heavy metals resulted in significant behavioural, biochemical, and histological alterations, including oxidative stress and tissue degeneration, especially in liver and kidney. The study provides critical insights into seasonal heavy metal dynamics, bioaccumulation, and associated ecological and human health implications in Bengaluru's urban lakes.

Keywords: *Seasonal variation, heavy metals, bioaccumulation, Environmental risk, Human risk, Bengaluru lakes.*

Publications:

1. **Ajjigudde Shreenivasa Shashank** and Krishnakumar Velayudhannair. (2025). Bioaccumulation and human health risk assessment of heavy metals in fish cultured in metropolitan city lakes: A case study in Bengaluru, South India. *Journal of food science and technology (Iran)*, 21(155), 41-57. <https://doi.org/10.60151/envec/ZLAO4807>
2. **Ajjigudde Shreenivasa Shashank** and Krishnakumar Velayudhannair. (2024). Comprehensive Assessment of Heavy Metal Pollution and Ecological Risk in Lakes of Bangalore, Karnataka, India. *Environment and Ecology*, 42(2), 479-491. <http://dx.doi.org/10.22034/FSCT.21.155.41>
3. **Shashank Ajjigudde Shreenivasa.**, Krishnakumar Velayudhannair, Arockiasamy, J. P., Shama, G., & Sivakumar, R. (2023). Determination of heavy metals in various tissues of locally reared (country) chicken in major districts of Karnataka, India: Assessment of potential health risks. *Archives of Veterinary Science*, 28(4), 1-10. <http://dx.doi.org/10.5380/avs.v28i4.91926>