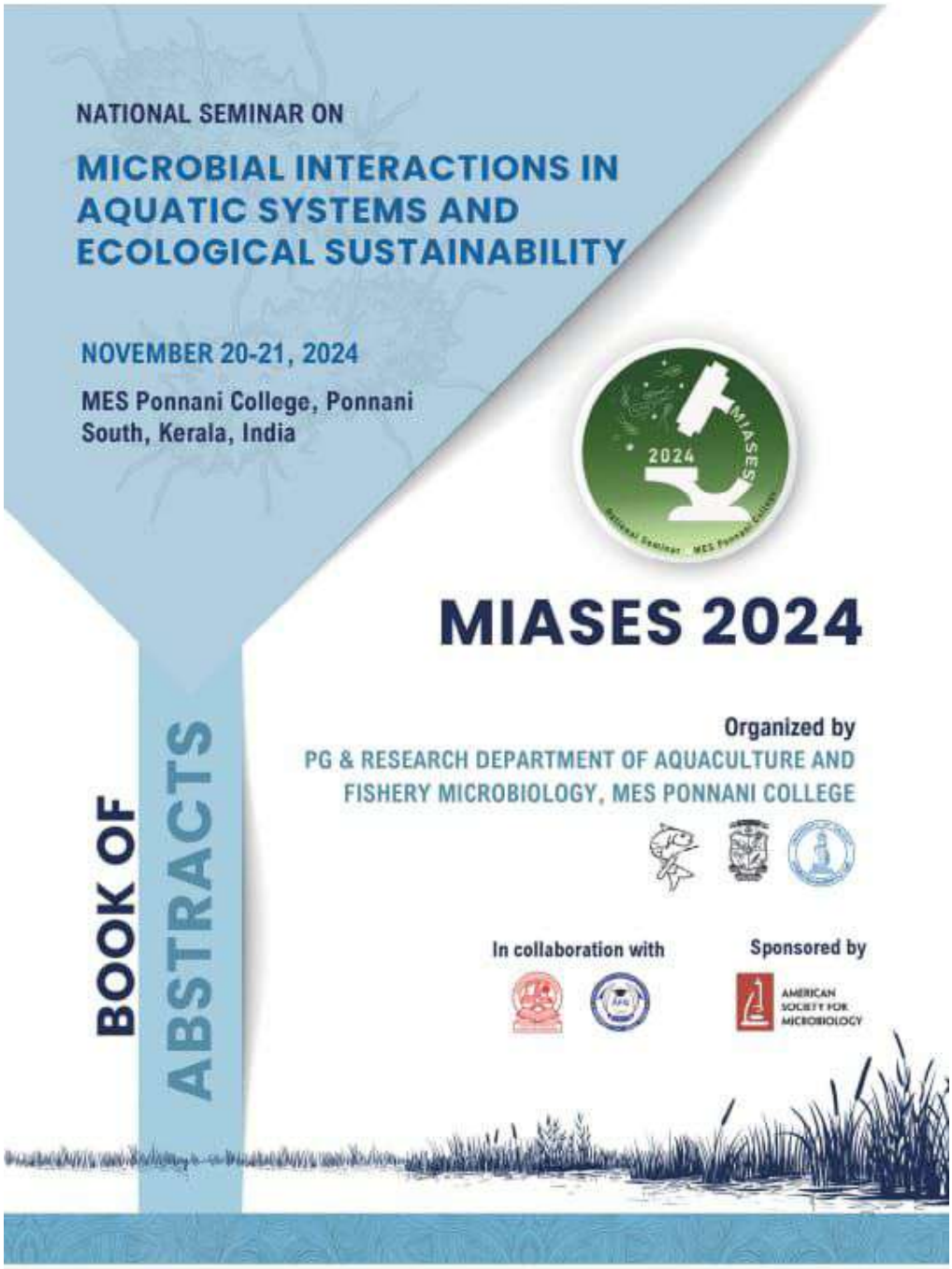

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# USE OF NATURAL ANTIMICROBIALS IN AQUACULTURE – A REVIEW

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This review explores the potential of plant-based antimicrobial compounds to control bacterial diseases in aquaculture, focusing on fish pathogens. The primary objective is identifying natural alternatives to synthetic antibiotics, which are increasingly linked to antibiotic resistance and environmental contamination. Various studies were analysed to assess the efficacy of different plant extracts, such as Chinese chive oil, neem leaf extract, *Bacillus* spp. from the fish gut, Malaysian herbs, *Nigella sativa*, *Psidium guajava*, and other locally available plants, in combating bacterial infections affecting fish. Chinese chive oil, *Nigella sativa* seeds, and oil have shown promising results in controlling *Flavobacterium columnare* infections in Nile tilapia (*Oreochromis niloticus*), suggesting its use as a natural antimicrobial against columnaris disease. Neem leaf extract was evaluated for its acute lethal and sublethal effects on *Prochilodus lineatus*, demonstrating both toxicity and potential benefits when used in controlled doses. Additionally, the isolation and characterization of *Bacillus* spp. from fish gut revealed natural antimicrobial compounds with the potential to replace synthetic antibiotics in disease management. Malaysian herbs were screened in their broad spectrum for antimicrobial properties, with several showing effectiveness against pathogens, highlighting the region's biodiversity for natural antimicrobials. Including *Psidium guajava* (guava) in fish diets reduced *Aeromonas hydrophila* infections in tilapia, indicating that plant-supplemented diets could enhance fish immunity and improve health outcomes. These studies demonstrate that natural plant compounds offer effective, sustainable disease management for aquaculture and serve as eco-friendly alternatives to synthetic antibiotics. The implications of these findings are significant for the future of aquaculture. Plant-based antimicrobials could help reduce dependency on chemical antibiotics. Further research must optimize use, dosage, and safety, ensuring these antimicrobials enhances fish health and sustainable aquaculture.

**Keywords:** Anti-microbial compounds, Bacterial disease, Fish pathogens, Fish immunity