

A Study of the Influence of Geographical Location on Usually Pathogenic Targeted Bacteria in the Gut of *Nemipterus virgatus* (Golden Threadfin Bream) in Different Marine Locations in the Western Province of Sri Lanka

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Fish, comprising nearly half of all vertebrates, have diverse physiological and ecological traits. Their gut microbiome is crucial for health and development, influenced by geography, diet, and lifestyle. While fish gut microbiome research is extensive, the impact of geography on pathogens in *Nemipterus virgatus* remains underexplored. This study examined how geographical location affects gut pathogens in this key species, vital to local fisheries and the economy. Stratified random sampling was used to collect fish from Negombo, Muthuwella, and Beruwala and analyzed for pathogenic bacteria in the gut using microbiological methods, including biochemical tests, selective and differential media culturing, disc diffusion methods, and PCR targeting *Enteropathogenic Escherichia coli* (EPEC) to distinguish between typical and atypical strains, while traditional methods sufficed for *Salmonella* and *Shigella* detection. Findings showed that 29.3% (17 out of 58) of the samples harbored targeted pathogens (*Salmonella*, *Shigella*, and *Escherichia coli*). Statistical analysis using a chi-squared test (p -value < 0.05) confirmed a significant correlation between pathogen presence and geographical location. Antibiotic susceptibility tests revealed 100% resistance to ampicillin and erythromycin, with 47% sensitivity to chloramphenicol. PCR analysis identified an atypical EPEC strain, with 2 out of 6 samples showing a band for targeted *eaeA* primers and no bands for *bfpA* primers. This study provides insights into how geographic location influences pathogenic bacteria in fish guts and its potential impact on antibiotic resistance. Future work using sequencing, q-PCR, and optimized multiplex PCR could enhance the identification of additional pathogenic strains and improve health outcomes for both humans and fish.

Keywords: *fish gut microbiome, geographical and marine locations, targeted pathogens, EPEC, atypical EPEC, bfpA, eaeA*