



Quality and Safety Evaluation of *Scomberomorus guttatus* (King Mackerel) and *Selar crumenophthalmus* (Bigeye Scad) from a Coastal Market in Galle, Sri Lanka

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The quality of marine fish is determined by a variety of biological and chemical threats that also pose serious concerns to human health, making seafood safety a growing global concern. In order to provide a comprehensive understanding of potential health risks and overall seafood quality, the study focused on evaluating the quality and safety of two specific marine fish species, *Scomberomorus guttatus* and *Selar crumenophthalmus* collected from a coastal market in Galle district, Sri Lanka, from October 2025 to January 2026. The study involved pH measurement, mercury determination, qualitative biochemical and phytochemical analysis with microbial as well as molecular analysis using samples collected through a convenience sampling method. The average pH of *Scomberomorus guttatus* was 6.05 ± 0.02 , while *Selar crumenophthalmus* showed a pH of 5.86 ± 0.03 , indicating no statistically significant difference ($n = 3$, $p > 0.05$) which is within the acceptable range for consumption. Mercury levels were measured using Inductively Coupled Plasma Mass Spectrometry, with *Scomberomorus guttatus* recording 0.20 mg/kg and *Selar crumenophthalmus* showing <0.1 mg/kg, both of which are within the WHO permissible safety limits. Qualitative biochemical analysis showed the presence of carbohydrates, protein, and lipids in both fish species, while phytochemical analysis showed the absence of glycosides and phenolic compounds. To evaluate microbiological contamination, molecular techniques such as DNA extraction, Polymerase chain reaction (PCR), and Sanger sequencing were employed. Sanger sequencing revealed the presence of *Proteus mirabilis* and *Citrobacter freundii* in *Scomberomorus guttatus*, and *Proteus mirabilis* in *Selar crumenophthalmus*. These results were consistent with the findings obtained from Gram staining and IMViC tests. Both fish species were within safe limits for mercury and freshness indicators. However, the presence of potential pathogenic bacteria indicates microbial contamination, likely arising from inadequate handling, processing, or storage conditions. These findings emphasize the need for improved hygiene practices throughout the seafood supply chain to ensure product safety and protect public health.

Keywords: *Citrobacter freundii*, *Proteus mirabilis*, Mercury contamination, Microbial contamination, *Scomberomorus guttatus*, *Selar crumenophthalmus*