Molecular Characterization and Diversity of Bacteria Isolated from Fish and Fish Products Retailed in Kenyan Markets

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Abstract

Fish products are highly vulnerable to microbial contamination due to their soft tissues, making them perishable and harmful to consumers. The clinical and subclinical infections reported by fish consumers are mainly associated with pathogenic microorganisms in fish products. Therefore, this study aimed at establishing the molecular profiles and diversity of the bacterial isolates from fish and fish products obtained from Kirinyaga County markets in Kenya. A total of 660 samples were randomly sampled in six Kirinyaga County markets and transported to Kenyatta University for bacterial isolation. The fish skin surface was cut using a sterile knife and blended in buffered peptone water. The blended product was serially diluted and plated on nutrient agar. After 24 hours, the bacteria cultures were subcultured to obtain pure bacterial isolates. The pure isolates were grouped and characterized based on their morphology and biochemical characteristics. One representative of each group was selected for bacterial DNA extraction. The 16S rRNA gene was amplified using the 27F and 1492R primers, and the obtained PCR product was subjected to Sanger-based sequencing using the same primers. Morphological characterization yielded 54 morpho groups. Phylogenetic analysis revealed diverse bacterial strains, including Escherichia coli, Salmonella enterica, Citrobacter freundii, Bacillus sp. and Alcaligenes faecalis. Bacillus sp. was the most dominant group, as compared to other isolates in the study. The study, therefore, revealed diverse bacterial strains from the fish products. This high microbial diversity calls for heightened surveillance to prevent possible foodborne disease outbreaks.

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