

**ANTIOXIDATIVE ACTIVITIES AND LACTIC ACID BACTERIA
COMPOSITION OF FERMENTED FRIGATE TUNA AT DIFFERENT
SALT-FISH RATIO**

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ABSTRACT

The antioxidative activities and lactic acid bacteria (LAB) composition of fermented frigate tuna (*Auxis thazard*), locally known as *tinabal*, at different salt-fish ratios were investigated. Fresh frigate tuna were degutted and cleaned before the addition of salt at different salt-fish ratio (w/w), (1:3), (1:4), (1:5), (1:6), and then fermented at ambient temperature. Samples were taken on day 0, 1, 4, and 7 for the pH determination, total titratable acidity measurement, and the different antioxidant activity assays that include testing for radical scavenging activity of ABTS⁺, ferric reducing power, hydrogen peroxide and singlet oxygen radicals. Isolation of lactic acid bacteria (LAB) for bacterial identification was also conducted as well as the measurement of the degree of hydrolysis for peptide profile analysis of fermented product.

Results show that the LAB viable count in the fermented samples increased, and the pH levels decreased with increasing % titratable acidity during the 7 days of fermentation. Isolated LAB and LAB-like species with gram positive, catalase negative, and non-spore forming properties were presumptively identified as *Lactobacillus casei*, *Lactobacillus fermenti*, *Lactobacillus delbrueckii subsp. delbrueckii*, *Pediococcus pentosaceus*, *Leuconostoc spp.*, *Enterococcus faecalis* and *Streptococcus spp.* In this study, the free amino acids due to hydrolysis increased with fermentation time for the different salt-fish ratios and DH was influenced by the length of fermentation. The ethanolic extracts from F3 (1:6) sample showed strong antioxidative activities against ABTS⁺ radical, while sample F1 (1:4) showed high reduction of ferric ions, and sample F2 (1:5) exhibited high antioxidative activities against ¹O₂ radical which is the major cause of damage to bioactive compounds that leads to oxidative stress in fermented products.

Results further revealed that *tinabal* could be a potential source of natural antioxidants for industrial uses. In addition, presence of important LABs in F2 (1:5) indicated that this fermented product could serve as a good source of LAB for applications to other fermented products as starters for improved product quality. In particular, *tinabal* fermented with F2 salt-fish ratio (1:5) has potential to be a functional food product that could benefit the consumers.

Keywords: Frigate tuna, antioxidant activity, lactic acid bacteria, degree of hydrolysis, *tinabal manko*