ABSTRACT

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EVALUATION OF *Saccharomyces cerevisiae* AND *Lactobacillus plantarum* FERMENTATION PROCESS TOWARDS TUNA WASTE QUALITY
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Tuna processing industries in Indonesia produce substantial waste, presenting as an environmental and economic challenge. Despite the high-protein potential, these wastes are underutilized causing missed opportunities for value-added applications. Microbial fermentation offers a sustainable approach for protein enrichment of tuna waste while maintaining good quality protein through acceptable TVBN and TMA levels. Furthermore, the addition of additional substrates may enhance fermentation efficiency. Therefore, this research aims to investigate the effects of fermenting microbes (*S. cerevisiae*, *L. plantarum*, and their combination) and additional substrates (pineapple peel or molasses) on tuna waste fermentation over certain fermentation periods (1, 3, and 5 days) on the total nitrogen, TVBN, and TMA content, as well as to determine the best treatment for total nitrogen enrichment of fermented tuna waste with acceptable TVBN and TMA level. Tuna waste was inoculated (1:175, v/w) with respective microbes grown to the desirable concentrations and added with additional substrates at 1:10 ratio (w/w). The total nitrogen, TVBN, and TMA content were analyzed on day 0 (control), 1, 3, and 5. Results showed that the interaction among these variables significantly influenced the observed parameters. Pineapple peel greatly enhanced proteolytic activity, while molasses better supported microbial activity associated with TVBN and TMA levels regulation, regardless of the microbes applied. The best treatment was the three-day fermentation using a combination culture and molasses, yielding a significantly higher total nitrogen content (8.00±0.58%) than that on day 0 (2.39±0.53%). Meanwhile, the increase in TVBN (16.31±0.40 mg N/100 g) and TMA (8.60±0.65 mg N/100 g) remained insignificant compared to day 0 (5.14±2.57 mg N/100 g and 2.60±1.79 mg N/100 g, respectively) and remained within acceptable limits. These findings suggest that optimizing fermenting microbes and additional substrates combinations can support sustainable protein recovery from tuna waste without compromising product quality.

Keywords : Fermentation, *Lactobacillus plantarum*, molasses, pineapple, protein, *Saccharomyces cerevisiae*, TVBN, TMA, tuna waste
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