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Utilization of Yellowfin Tuna and Red Snapper Roe Protein Concentrate as Emulsifier in Mayonnaise

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Abstract: Roes of yellowfin tuna (Thunnus albacares) and red snapper (Lutjanus champecanus) are considered as abundant and underutilized by-product in Indonesia. The production of roe protein concentrate (RPC) is expected to increase the economic value and potency of their usage. Tuna and red snapper RPC was defatted using ethanol 95% with one, two, three and four times of repetition. Both RPC made with four times repetition of defatting had the highest protein content (79.90% and 80.72%), showed high emulsion activity (97.46% and 99.62%) and emulsion stability (97.10% and 99.48%), and decreased the interfacial tension of 51% and 55.9%, respectively. Mayonnaise was made with 0, 25, 50, 75 and 100% substitution level of each RPC with four times repetition of defatting. The physical, chemical and organoleptic properties of mayonnaise were studied. The best mayonnaise formulation was obtained from 50% substitution level of tuna and red snapper RPC. Mayonnaise with tuna and red snapper RPC had good viscosity (5,920 cPs and 5,845 cPs), high emulsion stability (90.5% and 91.73%) and small fat globule size (± 2.5 µm and ± 2.25 µm), respectively. These mayonnaises also showed high score of spreadability and low intense of fishy odor. However they still had quite strong of fishy flavor based on scoring test.

Key words: Emulsifier, mayonnaise, red snapper, yellowfin tuna, RPC.

1. Introduction

Yellowfin tuna (Thunnus albacares) and red snapper (Lutjanus champecanus) are two fish species abundantly found in Indonesia. Fish processing industries of tuna and red snapper produce large quantities of fish roe daily. Those two kinds of fish roes are categorized as underutilized source of raw material in Indonesia due to their undesirable odor and highly perishable nature. Majority of fisheries by-products are presently used in the production of fertilizer, fish meal and pet food that have no economic value. By-product utilization will improve the economic aspects of processing industry and further their functional and nutritional beneficiation. An experiment [1] reported that protein extracted from fish roes were high quality protein and had desirable emulsifying properties. Furthermore, fish roes were also reported to be a good source of protein and amino acid [2, 3].

Roes of tuna and red snapper can be converted into a higher value food ingredient by processing them into roe protein concentrate (RPC). Research on fish protein concentrate (FPC) from several types of fish meats has been widely developed, however literature on protein concentrate made from fish roes from tropical water fish is still limited. Therefore, the investigation on physico-chemical and emulsifying properties of RPC were conducted in this research. The repetition in defatting step was estimated to maximize the protein content and the emulsion properties of both RPC [4].

Mayonnaise is oil-in-water (o/w) emulsion that traditionally uses egg yolk as emulsifier. Nevertheless,