

OPTIMASI KONDISI PEMURNIAN ASAM LEMAK OMEGA-3 DARI MINYAK HASIL SAMPING PENEPUNGAN TUNA (*Thunnus sp*) DENGAN KRISTALISASI UREA

[Optimizing Conditions for the Purification of Omega-3 Fatty Acids from By-product of Tuna (*Thunnus sp*)
Meal Processing by Urea Crystallization

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ABSTRACT

Omega-3 fatty acids (w-3) are proven to have health beneficial effects. Some effort had been done to obtained oil high in w-3 fatty acids. Among the methods developed, urea crystallization was preferred because it is simple, economic, and result in high purity of fatty acids. A source that had not been widely explored for w-3 fatty acids production is the by-product of tuna meal processing. This research studied the optimization condition for separation and purification of w-3 fatty acids from the by-product of tuna meal processing by urea crystallization. Crystallization reaction conditions of urea inclusion were optimized using the response surface methodology, and the model was developed. Optimization result showed a quadratic polynomial regression equation of $Y = 140,52677X_1 + 8,38203X_2 - 19,85850X_1^2 - 0,12173X_2^2 - 0,74000X_1X_2 - 240,33546$ with X_1 =urea to fatty acid ratio and X_2 =crystallization time. Maximum response was obtained at urea to fatty acid ratio of 3,07:1, crystallization time of 25,10 hours, and predicted response was 80,60%. Analysis of variance showed that urea to fatty acid ratio and crystallization time affected response. Under optimal conditions, the product was 3.89 times concentrated and the purity of w-3 fatty acids was 81,98%. Verification result revealed that the predicted value from this model was reasonably close to the experimentally observed value. Urea crystallization process changed quality parameters that were oxidation level (peroxide value, anisidin value, and totox value), Fe and Cu content, P content, and water content. The changes were caused by adsorption of primary and secondary oxidation products, part of metals, and phosphoric compound onto unsaponifiable matters or soluble into water.

Key words : w-3 fatty acids, concentrate, urea crystallization, optimization