Enrichment of Sardine oil with n-3 polyunsaturated fatty acids in glyceride and free fatty acid fractions by enzymatic hydrolysis

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Abstract

Fish oils are a readily available source of polyunsaturated fatty acids (PUFA) which play an important role in human health and nutrition. To date, there are many publications dealing with fish oils and *n*-3 fatty acids and primarily with health and medical aspect. Eicosapentaenoic acid (EPA), *n*-3 fatty acids and docosahexaenoic acid (DHA) have been shown to be of major importance in the prevention of a number of diseases, including coronary heart disease, inflammation, hypotriglyceridemic effect, allergies and diabetes. Due to the health benefits of the *n*-3 fatty acids, there has been a demand from the food, neutraceutical food and pharmaceutical industries for stable, high purity, concentrated *n*-3 products. Several extraction and physical fractionation methods are reported to concentrate *n*-3 fatty acids from marine oils, such as crystallization in solvent or urea complexation. Selective enzymatic hydrolysis of marine oil has gained popularity in recent years to remove saturated fatty acids and to concentrate the *n*-3 PUFA.

In attempt to produce the *n-3* polyunsaturated fatty acid, Sardine oil was hydrolysis with various lipase enzymes. Base on result, 1,3-specific *Porcine pancereas* lipase and *Candida cylindracea* lipase was selected. With 1,3-specific *Porcine pancereas* lipase, sardine oil was enriched with *n-3* PUFA in glyceride faction and with nonspecific *Candida cylindracea* lipase, sardine oil was enriched with *n-3* PUFA in free fatty acids fraction. After hydrolysis, glyceride fraction and free fatty acid fraction were separated and PUFA compositions was determined and analyzed. The effects of operational parameter (pH, temperature, enzyme and subtract ratio, reaction time) were investigated. And then, optimal reaction condition was established.

References

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