

Candida antartica Lipase Assisted Enrichment of n-3 PUFA in Indian Sardine Oil

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Abstract : Indian oil sardine (*Sardinella longiceps*) are one of the richest and cheapest sources of n-3 polyunsaturated fatty acids (n-3 PUFA) such as Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA). The health benefits conferred by n-3 PUFA upon consumption, in the prevention and treatment of coronary, neuromuscular, immunological disorders and allergic conditions are well documented. Natural refined Indian Sardine oil generally contain about 25% (w/w) n-3 PUFA along with various unsaturated and saturated fatty acids in the form of mono, di, and triglycerides. Having high concentration of n-3 PUFA content in the glyceride form is most desirable for human consumption to avail maximum health benefits. Thus, enhancing the n-3 PUFA content while retaining it in the glyceride form with green technology is the need of the hour. In this study, refined Indian Sardine oil was subjected to selective hydrolysis by *Candida antartica* lipase to enhance n-3 PUFA content. The degree of hydrolysis and enhancement of n-3 PUFA content was estimated by determining acid value, Iodine value, EPA and DHA content (by Gas Chromatographic methods after derivitization) before and after hydrolysis. Various reaction parameters such as pH, temperature, enzyme load, lipid to aqueous phase volume ratio and incubation time were optimized by conducting trials with one parameter at a time approach. Incubating enzyme solution with refined sardine oil with a volume ratio of 1:1, at pH 7.0, for 60 minutes at 50 °C, with an enzyme load of 60 mg/ml was found to be optimum. After enzymatic treatment, the oil was subjected to refining to remove free fatty acids and moisture content using previously optimized refining technology. Enzymatic treatment at the optimal conditions resulted in 12.11 % enhancement in Degree of hydrolysis. Iodine number had increased by 9.7 % and n-3 PUFA content was enhanced by 112 % (w/w). Selective enhancement of n-3 PUFA glycerides, eliminating saturated and unsaturated fatty acids from the oil using enzyme is an interesting preposition as this technique is environment-friendly, cost effective and provide natural source of n-3 PUFA rich oil.

Keywords : *Candida antartica*, lipase, n-3 polyunsaturated fatty acids, sardine oil

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