

## Enzymatic Production of Omega-3 Enriched Triglycerides

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Polyunsaturated omega-3 fatty acids from marine oils, particularly those high in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are important because of their beneficial health effects. Concentrated omega-3 fatty acids are commercially available in several forms: triglycerides, ethyl esters, or free fatty acids. Lipases can effectively transform these forms of fish oil under mild conditions at an industrial scale. The limiting step in the production of enzymatic re-esterified triglycerides is the conversion of diglyceride to triglyceride, and we examined the factors affecting the reaction. An important factor is acyl migration of a 1,3- diglyceride to a 1,2- diglyceride; it is unclear if lipases can directly add an acyl group to the 2-position, or if migration followed by acylation of the 1-position is preferred. We examined this process using model compounds. 1,3- Dipalmitin was acylated with DHA using immobilized *Candida antarctica* lipase B. This produced a mixture of triglycerides, which were analyzed by NMR and HPLC. The mixture of triglycerides was identified by comparison to synthesized lipid standards prepared using carbodiimide coupling and characterized by NMR.