

Characteristics of Microcapsule of ω -3 Fatty Acids Enriched Oil from Lemuru Meal Processing

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Abstract

Omega-3 fatty acids enriched fish oil from lemuru fishmeal processing met the quality standard of food grade fish oil, but it was susceptible to oxidation. Microencapsulation by spray drying was one method that could protect this oil against oxidation and the microcapsule could be applied more widely and easier to handle. The important factor that affected microencapsulation process by spray drying method was encapsulant to core ratio. The objective of research was to elucidate the effect of encapsulant to core ratio (2:1; 3:1; 4:1; 5:1; and 6:1 (w/w)) on characteristics of ω -3 fatty acids enriched fish oil microcapsule. The increase of microencapsulation efficiency and the decrease of surface oil proportion were related to better emulsion stability prior to spray drying and film forming ability around oil globule as the sodium caseinate proportion increased. Emulsification and heating during spray drying could induce hydrolysis of triglycerides in fish oil. Therefore, the quantity of free fatty acids relatively unchanged although the proportion of encapsulated oil decreased. The decrease of oxidation degree is caused by better protective effect of sodium caseinate during emulsification and spray drying due to better film forming ability as proportion of encapsulant increased. However, it was followed by the decrease of ω -3 fatty acids content that related to decreasing proportion of fish oil. This phenomenon was supported by unchanging ω -3 fatty acids retention that showed protective effect of sodium caseinate on oxidation during microencapsulation. Different encapsulant to core ratio did not change yield of microcapsule. Different proportion of surface oil did not affect microcapsule recovery.

Key words : fish oil from by product of lemuru meal processing, ω -3 fatty acids enriched oil, microencapsulation, spray drying, encapsulant to core ratio