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Fish Waste of *Anguilla nebulosa*, *Anguilla bicolor*, *Carcharhinus* sp. and *Netuma thallasina* for Production of Fish Oil**Zabith S.H.M.^{1*}, Pathirana H.M.K.K.²**¹*Institute of Chemistry, Rajagiriya, Sri Lanka*²*University of Ruhuna, Matara, Sri Lanka*

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Abstract

Fish waste is currently used in certain countries to produce fish oil. In Sri Lanka, most of the fish processing industries discard fish waste and it has caused a huge environmental problem. In addition to that Sri Lanka does not produce fish oil and it is imported. Therefore the objective of the present study was to use fish wastes to produce good quality fish oil by using solventless microwave extraction which is a green method. For *Anguilla nebulosa*, *Anguilla bicolor* (eel) and *Netuma thallasina* (Giant Marine Catfish) skin, viscera, flesh and head region were used and for *Carcharhinus* sp. (Shark), liver was used. The best heating conditions were identified by using different temperatures and different heating periods. The best conditions for catfish and shark were 2 min. at 90° C and for eel it was 4 min. at 130° C. Crude oil was obtained by filtering the extracts using a clean cotton cloth and then centrifuging at 2,800 rpm for 10 min. Crude oils were refined by treating with 2% (w/w) bentonite for 30 min. The yield of oils from eel, catfish and shark were 8.4%, 14.1% and 63.2%, respectively. Quality of fish oils were determined by measuring the peroxide value, saponification value, iodine value and free fatty acid level (FFA) by following AOCS methods. Except the free fatty acid level, other parameters of all three fish species agreed with the recommended levels. FFA level of eel (0.25%) and shark (0.56%) agreed with the recommended level (1-7%), but the value for catfish was high (8.3%). Bentonite treatment reduced it to an acceptable level (0.23%). Above treatment increased the peroxide value to 12.4 (mEq/kg) but it was less than the recommended maximum. Fatty acid profiles were studied for eel and catfish oils. Monounsaturated fatty acids were found in the highest amounts (40.6-49.8 %). Catfish oil is a better source for PUFA (9.2%) and DHA (2.2%) than the eel oil (PUFA, 0.9%; DHA, 0.8%). Fish oils from wastes of above three fish species are good sources for monounsaturated fatty acids. Oil from the wastes of catfish is a good source for PUFA especially for docosahexaenoic acid (DHA). The approach of producing fish oil from fish waste will solve the environmental problems caused by fish waste and also help to improve the economy of the country.

Keywords: Fish oil, Fish waste, Microwave-assisted extraction, Bentonite