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Valorization of Marine Coproducts for the Production of Food Supplement

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ABSTRACT

The main aim of this study is the extraction of oil from fish by-products through a conventional method, namely wet pressing, followed by a refining process aimed to lower a compounds that impair the oil's stability, quality, and acceptability without losing the PUFAs. Furthermore, we discussed characterization of oil, who revealed a good organoleptic and nutritional quality, a high percentage of omegas, an acceptable antioxidant activity and without any antibacterial activity. The results show that the by-product generated from Xiphias gladius co-products can be used as a dietary supplement.

Keywords: fish by-products, fish oil, fish meal, omegas.

1. Introduction

In the current era, global population growth is increasing and the supply of essential products to the human food industry is facing the pressure to produce more and more. Food systems need alternatives that can help meet this demand sustainably. The oceans not only regulate the climate, but also support economic growth by being a food source. According to the 2022 article from the FAO (Food and Agriculture Organizations of the United Nation); in order to avoid any economic loss, the valuation of food by-products is a fundamental alternative. In fact, 90% of fish from fisheries and aquaculture are processed to be used for human consumption [1]. Depending on the species, the fish processing industry wastes more than 60% of fish's gross weight [2], causing both an economic and an ecological problem. However, their valorization can give rise to new economic sources for human and animal feed, nutraceuticals, cosmetics and pharmaceuticals. These high value-added products currently represent a small percentage of market share but offers interesting development prospects given the growing demand in these areas [3]. Marine oils represent potential sources of polyunsaturated fatty acids (PUFAs) with proven nutritional and health implications [4]. The wastes (co-products) resulting from the transformation of marine species are: heads, viscera, bones, shells, tails, fins and skins. This study is part of the contribution to the search for added value of swordfish (Xiphias gladius) co-products through the extraction of its oil by a conventional method, namely, wet pressing followed by a refining process aimed at eliminating any substance likely to present a danger to the consumer.

2. Experimental

The swordfish coproducts (head, fins, and intestines) were cooked at a low temperature for 20 minutes, then pressed to extract a liquid. The pressed liquid was centrifuged to obtain the raw oil which will be refined. Refining requires several steps including degumming, neutralization, purification, winterization, deodorization and discoloration. Several parameters were determined in order to characterize the oil such as the yield, organoleptic analyzes (water content, acid index, peroxide index), the qualitative and quantitative study of swordfish oil by CG-MS and the study of a biological activity.

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3. Results and Discussion

The evaluation of the biochemical and biological properties of oil reveals a good organoleptic and nutritional quality with 40.93% omega 9 followed by 20.97% omega 3 and 17.65% omega 7. The antioxidant activity evaluated by the DPPH radical is 17%. The antibacterial study revealed no activity. The results show that the product generated from Xiphias gladius co-products can be used as a dietary supplement. Indeed, the oil obtained reveals a high amount of Omegas whose implications in terms of nutrition and health are proven.

4. Conclusion

In this study, oil extraction from swordfish co-products was carried out by conventional wet pressing and its characterization revealed a quality product. Thus, initiatives linked in particular to biochemistry and biotechnologies make it possible to get the most out of these co-products which are no longer considered as waste, rather they are transformed into a mine of solutions.

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