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Brief Commentary

Fatty Acid Changes in Patin Waste Oil: Implications for Aquafeed

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Introduction

The utilization of fish-processing waste as a source of high-value raw materials is gaining increasing attention in efforts to develop a sustainable aquaculture industry. One waste component with considerable potential is the mesenteric tissue of pangasius (Pangasianodon hypophthalmus), which contains high levels of lipids and can be processed into fish oil. Several findings indicate that the fatty acid composition of this material is strongly influenced by fish size and the heating conditions applied during the extraction process.

Variations in fish size play an important role in determining oil quality. Medium-sized fish (440-685 g) generally produce oil with a more stable proportion of unsaturated fatty acids, including cis-9-oleic acid (C18:1n9c) and small amounts of eicosapentaenoic acid (EPA-20:5n3) and docosahexaenoic acid (DHA-C22:6n3). This size group also shows a stronger correlation (r^2 = 0.72) between body weight and mesenteric tissue weight, indicating efficient lipid accumulation during this growth phase. This factor is relevant for the processing industry and feed manufacturers, as selecting the appropriate fish size can enhance waste-utilization efficiency and improve the quality of the resulting oil.

Heating temperature during extraction is another critical factor that affects the fatty acid profile. Low-temperature heating (45°C) has been shown to preserve unsaturated fatty acid components and reduce the formation of elaidic acid-an undesirable trans fat. In contrast, heating at higher temperatures (75-90°C) accelerates fatty acid oxidation and isomerization, resulting in decreased levels of EPA, DHA, and ARA. This phenomenon has been confirmed in various types of fish oil, where excessively high extraction temperatures can trigger lipid degradation and reduce nutritional quality [1]. In general, overheated fish oil is more prone to forming oxidative compounds and trans fats [2].

In the context of feed formulation, freshwater fish oil naturally contains lower levels of EPA and DHA compared to marine fish oil, yet its high MUFA and omega-9 content provides specific metabolic benefits for cultured fish. This oil can serve as a partial substitute in larval feeds, broodstock diets, or as a lipid carrier for micronutrients. Several studies have shown that replacing marine fish oil with freshwater fish oil or other alternative lipid sources can still support fish growth, provided that the nutritional composition remains balanced [3].

Conclusion

Overall, the utilization of pangasius waste as a source of fish oil offers significant potential for reducing dependence on marine fish oil and promoting circular-economy practices. However, controlling extraction temperature is essential to maintain oil quality. Further research is needed to evaluate the performance of this oil in feed formulations.

References

1) Zhuang Y, Dong J, He X, Wang J, Li C, et al. Impact of heating temperature and fatty acid type on the formation of lipid oxidation products during thermal processing. Front Nutr. 2022, 9:1-10.
2) Ismail A, Bannenberg G, Rice HB, Schutt E, MacKay D. Oxidation in EPA- and DHA-rich oils: an overview. Lipid Technol. 2016, 28:55-59.
3) Rattanapod E, Mengumphan K, Tongsiri S, Amornlerdpison D. Fatty acid composition of freshwater fish oil and its efficiency on growth performance in Nile tilapia. J Agr Res Exten. 2018, 35:11-20.