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FATTY ACID COMPOSITION OF CATFISH (*Clarias gariepinus*) VISCERA OIL

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ABSTRACT

The fatty acid composition of oil extracted from the viscera of African catfish, Clarias gariepinus caught from a fish farm in New Bussa was investigated with a view to prove their usefulness. A total of 20 fatty acids were obtained out of which five were identified. Lauric, Palmitic and Stearic acids were the main saturated and monounsaturated fatty acids respectively. The principal acids in the polyunsaturated group were Oleic and Linoleic acids. C. gariepinus viscera is constituted of polyunsaturated fatty acids which make it a valuable pharmaceutical raw material rather than waste.

INTRODUCTION

A great deal of attention has been recently paid to the various health benefits apparently associated with the consumption of fish rich in fish oil. Health benefits appear to be associated with the presence of high levels of the n-3 family of polyunsaturated fatty acids (PUFA) also called Omega-3 fatty acids such as eicosapentaenoic acid (EPA) and docosahexanoic acid (DHA) (Neil, 1997). Oily fish and fish oil supplements aid in the prevention and management of coronary heart disease (CHD), (Minnis *et*

al., 2006). Omega-3 fatty acid enriched seafood products are effective in lowering serum triglycerides and blood pressure (Inga-Britt *et al.*, 2004). They help in reducing the risk of developing an abnormal heart beat that can lead to heart problems and even sudden death. Catfishes of the family claridae comprise the most commonly cultivated fishes in Nigeria. The growth of aquaculture in Nigeria is now largely being boosted by the steady rise in catfish culture (Oresegun *et al.*, 2007).

The by-products of catfish processing consists of frames and viscera which are often thrown away. Viscera from catfish are an abundant and underutilized by-product that could be used as a unique lipid source (Sathivel, *et al.*, 2003). From the foregoing therefore, this experiment was conducted to determine the fatty acid composition of oil extracted from catfish (*Clarias gariepinus*) viscera.

MATERIALS AND METHODS

Live catfish (*Clarias gariepinus*) were harvested from a private fish farm in New Bussa, Niger State, Nigeria. The viscera were collected as the fish samples were being prepared for smoking by fish processors. A total of 2kg of viscera from 70 fish samples with average weight of 500g were collected and stored at -5°C. Extraction of the crude oil was carried out at the Analytical laboratory, National Institute for Freshwater Fisheries Research (NIFFR), New Bussa using the method of Stewart *et al.* (1974). The extracted oil of about 250ml was stored at ambient temperature before taken to the Central Science laboratory,

Obafemi Awolowo University, Ile-Ife, Nigeria for fatty acid determination.

The fatty acids were converted to their methyl esters and heptanes according to the method of Christie (1997). About 5 ml of the oil was esterified with acetone (59:41). The reaction mixture in vials was heated at 80 °C on hot plate for 30 min, cooled and then diluted with water, extracted with diethyl ether and analysed by high pressure liquid chromatography (HPLC). Identification and quantification of fatty acids were carried out in HPLC using the methods of Christie (1997). Reference standards which had been developed with use of application of HPLC overtime was used to identify the components using relative retention time. A total of five fatty acids for which reference standards were available were identified.

Percentage composition of each fatty acid identified was calculated using peak area as follows:

$$\% \text{ Fatty Acid} = \frac{\text{Peak area of sample} \times \text{conc. of std.} \times \text{dilution factor}}{\text{Peak area of standard}}$$

RESULTS AND DISCUSSION

The profile and percentage composition of the 5 different fatty acids identified from the catfish (*Clarias gariepinus*) oil is presented in Table 1. Lauric acid was the dominant (37.24%) followed by Linoleic acid (13.52%). Oleic acid was low (6.04%) while Myristic acid was absent. The low content of Oleic acid may be attributed to the poor quality of feed fed to the fish. Satoh *et al.*, (1989) reported that diet had a major effect on the fatty acid composition of lipid. Linoleic acid was the dominant polyunsaturated fatty acid (13.52%). This finding is similar to the reports of Ollis *et al.*, (1999) and Sathivel (2009). Polyunsaturated fatty acids (PUFAs) are known to prevent/reverse insulin resistance

by decreasing TNF- α levels and possibly by enhancing adiponectin levels. This PUFAs are likely to be useful in preventing ad/or reversing some of the side effects of retroviral drugs. Das (2006) reported that direct intake of various PUFAs alters the cell membrane fatty acid composition, which in turn, modulates cell/tissue response to infection, injury and inflammatory actions.

CONCLUSION

From the findings of this experiment, catfish (*C. gariepinus*) viscera rather than being wasted as it is presently done by most fish processors around Lake Kainji (New Bussa) could be a rich source of PUFAs which could also be of immense health benefits to consumers.

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Table 1: Fatty Acid composition (%) of *Clarias gariepinus* viscera oil

Fatty acid	% Composition
Lauric acid	37.24
Oleic acid	6.04
Palmitic acid	12.86
Linoleic acid	13.52
Steoric acid	1.32
Myristic acid	-