

Enrichment of Omega-3 Fatty Acids using Urea Complexation Method to Enhance the Nutritive Value of Stingray Fish (*Dasyatis Sephen F.*) Liver Oil

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This paper describes the study performed on Ray fish liver oils from fish by-products discarded from a dry fish processing industry where usually discarded.

Even though refined fish oil has a numerous health benefits, only certain people afford to consume it as fish oil is an expensive item. Presently, the fish production is becoming more demanding as there is a sizable and growing world market demand for high quality fish oil. Apart from its various uses as consumable oil, it is also appreciable in both pharmaceuticals and food industries. Past literature has shown that little work has been done in terms of Ray fish liver oil and its fish by-products. Therefore, Ray fish liver oil may have applications in food, feed manufacturing and other industries via improve nutritive value of crude ray fish live oil.

2. Materials and Methods

2.1 Study Location

This study was conducted in the Fisheries Harbors of Gurunagar and Delft Islands, Jaffna, Northern Provenience in Sri Lanka. Analysis was conducted in the Nutrition Laboratory, Meat Science Laboratory, Department of Animal Science, Food Science Laboratory, Department of Food Science, Faculty of Agriculture, and University of Peradeniya and in the Beuro Veritas, Colombo, Sri Lanka.

ABSTRACT

Lipid fraction extracted from tissues of oily fish and fishery by-products are one of the best source of omega-3 (ω -3) polyunsaturated fatty acids (PUFAs), mainly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Method of oil extraction from the *Dasyatis sephen* liver is simple and cheap. Therefore, the present study was conducted to extract and enrich the Omega-3 fatty acids from *Dasyatis sephen* liver which is discarded during dry fish production. Bligh and Dyer's method was used to extract oil. Fatty acids profiles were determined by Gas-Liquid Chromatography method (GLC). Average liver lipid recovery was 69.54 % (w/w). Crude liver oil fatty acid profile of DHA and EPA was 0.5% and 0.6%, respectively. Urea complexation was done to enrich the extracted Omega-3 fatty acids. Physio-chemical properties such as moisture content, color, specific gravity, peroxide value, and fatty acid compositions were obtained under the tolerable standard. The level of DHA:22:6n-3 and EPA: 20:5n-3 in the enriched *Dasyatis sephen* oil were 9.7 % and 8.7 %, respectively. It could be concluded that the converting of Ray fish by-product into enriched oil is an opportunity of adding value to the fish by-product and could be suitable for applications in pharmaceutical and nutraceutical industries.

KEYWORDS: Fatty acid, Fish Oil, Omega-3, Ray Fish, Urea Complexation

1. INTRODUCTION

Fish oil is the lipid fraction extracted from tissues of oily fish and fishery by-products and it is the best source of omega-3 (ω -3) polyunsaturated fatty acids (PUFAs), especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

2.2 Sample Collection and Preparation

Samples of Three Stingray fish *Dasyatis sephen* (Forsskal, 1175) were collected from each Fisheries Harbors and Dry Fish Cottages of Jaffna. They were transported in sealed freezer containers to laboratory at (-8 °C) and stored at (-20 °C) in the deep freezer for analyses. Each were taken out to thaw at room temperature to measure its lengths and weights as whole. Samples were eviscerated and its livers, offal (gut & tail) and carcass were stored at (-20 °C) in sealed in poly bags separately for further analysis.



Plate 2.1: Sting Ray (*Dasyatis sephen*)(Dorsal View)