



Recovery of antioxidant from *Decapterus Macarellus* waste using wet rendering method

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ABSTRACT

In Malaysia, *Decapterus Maruadsi* is widely used as the main ingredient in food products such as 'keropok lekor' and fish cracker. The wastes generated from the fish snack industry are underutilized and most are discarded into the sea, generating considerable environmental pollution. The recovery of antioxidants in the fish wastes could lead to the development of a very exciting and promising alternative source of commercial antioxidant compounds. The objective of the present work is to investigate the effect of temperature, type of solvent, extraction time, and ratio of sample to solvent loading in the extraction of antioxidants from *Decapterus Maruadsi* waste using the wet rendering method. The collected fish waste of *Decapterus Maruadsi* was pre-treated and then subjected to a wet rendering treatment at 0–60 °C for 30–150 min with ratio of sample to solvent loading of between 1:10 and 9:10 (w/v). The presence of antioxidant in the extract was analyzed using 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and Total Phenolic Compound (TPC) assays. Based on the results of this study, wet rendering treatment performed for 90 min at 30 °C with a ratio of sample to solvent loading of 3:10 produced an extract with the highest concentration of active antioxidant compounds. Besides, only N-Acetyl-glutamic acid was identified with LCMS QTOF analysis. These results suggest that the fish waste of *Decapterus Maruadsi* can be exploited to become a source of antioxidants for food and pharmaceutical applications.

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1. Introduction

Decapterus maruadsi is a small low-value pelagic fish belonging to the family of mackerel. They are commonly found in Malaysian waters and have food, biomass, and commercial value [1]. In 2017, 455,849 mt of fish from various species were landed in Malaysia, of which 36,679 mt is from the *Decapterus maruadsi* species [2]. This fish is a popular main ingredient of Malaysian fish cracker since the aroma, crispiness, and colour that the fish imparts on the final product are highly appealing to consumers [3]. While the fish meat goes into making the crackers, the other parts of the fish such as bone, fin, fish head, and tail are discarded as waste, leading to environmental pollution issues. The fish wastes are rich in antioxidants, proteins, collagens, and flavours that could be repurposed by many industries including food, agriculture, aquaculture, and

pharmaceuticals [4]. Despite the commercial value of *Decapterus maruadsi* in the production of fish cracker in Malaysia, little effort has been put into optimizing the utilization of its waste. Therefore, the extraction of new value-added products such as antioxidants can pave the way for full utilization of *Decapterus maruadsi* biomass as a whole.

Antioxidants can be extracted from fish waste via various enzymatic, chemical, or conventional methods [5]. Some methods that have been noted are hydrolysis, rendering, ultrasound, microwave, and pressure-assisted extractions [5]. Recently, round scad protein hydrolysate with antioxidative activity has been successfully produced via ultrafiltration, gel filtration chromatography, and reverse-phase high-performance liquid chromatography (RP-HPLC) [6], and enzymatic hydrolysis [7,8]. However, these methods require consecutive process, expensive scale-up, longer extraction time, and a commercial enzyme formulation to start the reaction [5]. Besides these methods, wet rendering is found to be a favourable method because of its affordability, ease of handling, and

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