DETERMINATION OF HEAVY METALS IN SELECTED FISH SAUCE

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ABSTRACT

This study was carried out to determine the amount of heavy metals and compare with permitted level as stated in the Food Regulation (1985) of some selected fish sauce. The amount of heavy metals was detected using Induced Couple Plasma – Optical Emission Spectroscopy (ICP-OES). There were three samples of selected fish sauce sample A, sample B, and sample C. Sample A contained the highest lead, cadmium, and zinc content which were 3.94 mg/kg, 36.57 mg/kg, and 54.93 mg/kg respectively and the lowest was aluminium (4.10 mg/kg). While sample B contained lead, cadmium, zinc and aluminium which were 2.58 mg/kg, 27.46 mg/kg, 52.63 mg/kg and 5.66 mg/kg respectively. Besides, sample C has the highest amount of aluminium (36.39 mg/kg) and lowest amount of zinc (13.18 mg/kg). Generally, all the samples have very high level of cadmium with the value exceeded the permitted level of 1 mg/kg as stated in the Food Regulation (1985).

CHAPTER 1

INTRODUCTION

1.1 Background and problem statements

Metals differ from other toxic substances in that they are neither created nor destroyed by humans. Humans have used heavy metals in many different areas for thousands of years; this use influences their potential for health effects in at least two major ways: first, by environmental transport, that is, by human or anthropogenic contributions to air, water, soil, and food, and second by altering the speciation or biochemical form of the element (Beijer and Jernelov, 1986).

Food safety is a major public concern worldwide. During the last decade, the increasing demand of food safety has stimulated research regarding the risk associated with consumption of foodstuff contaminated by heavy metal or toxins (D'Mello, 2003). Heavy metals are among the major contaminants of food supply and may considered the most important problem to our environment (Zaidi et al., 2005). Heavy metals, in general, are not biodegradable, have long biological half-live and have the potential for accumulation in the different body organs leading to unwanted side effect (Jarup, 2003; Sathawara et al., 2004). Although several adverse health effects of heavy metals have been known for a long time, the exposure to these elements continues; moreover, it is even increasing in

some parts of world, in particular in the less developed countries, though emissions have declined inmost developed countries over the last 100 years (Jarup, 2003). Owing to their toxicity persistence and tendency to accumulate in water and sediment, heavy metals and metalloids, when occurring in higher concentrations, become severe poisons for all living organisms (Has-Schön et al., 2006).

Lead and cadmium are among the most abundant heavy metal and particularly toxic. The excessive content of these metals in food is associated with etiology of a number of diseases, especially with cardiovascular, kidney, nervous as well as bone diseases (WHO, 1992, 1995; Steenland and Boffetta, 2000; Jarup, 2003). In addition, they also implicated in causing carcinogenesis, mutagenesis and teratogenesis (Pitot and Dragan, 1996). Other metals such as copper and zinc are essential for important biochemical and physiological function and necessary for maintaining health throughout life. Zinc deficiency results in a variety of immunological defects whereas copper deficiency is characterized by anemia, neutropenia, and skeletal abnormalities (Prentice, 1993; Linder and Azam, 1996)