

**DETERMINATION OF HEAVY METAL IN SELECTED SALTED FISH BY
USING ICP-OES**

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ABSTRACT

This study was carried out to determine the amount of heavy metals such as Pb, Cd, Cu, Al and Zn in selected salted fish such as “ikan kembung” (*Indian mackerel*), “ikan kurau” (*Treadfin*), and “ikan cencaru” (*Torpedo scad*) by using Induced Couple Plasma–Optical Emission Spectroscopy(ICP-OES). The concentration of heavy metal in each sample was compared with permitted level as stated by Food Act 1983 and Food Regulation 1985 and also with FDA and WHO regulation. The samples of salted fish were digested using wet digestion method. The highest concentration of Cd was observed in “ikan cencaru” (148.367 mg/kg) followed by “ikan kurau” (131.467 mg/kg) and “ikan kembung” (96.583 mg/kg). These values exceeded the maximum permitted level which is 1 mg/kg. The salted fish were also contaminated with Zn in “ikan kurau” (31.067 mg/kg), “ikan cencaru” (3.179 mg/kg) and “ikan kembung” (9.167 mg/kg). According to FDA the safe upper limit in body for Zn is 15 mg/kg. Cu was determined in “ikan kembung” (3.874 mg/kg) and “ikan cencaru” (38.733 mg/kg) but it was not detected in “ikan kurau”. According to FDA regulation the safe upper limit for human daily intake for Cu is 100mg/day. Al was determined in “ikan kurau” (5.506 mg/kg) and “ikan cencaru” (0.365 mg/kg) but it was not detected in “ikan kembung”. The maximum permitted for Pb in fish product is 2 mg/kg, however for all selected samples of salted fish Pb was not detected. Hence it can be concluded that most of the samples were contaminated with heavy metals which are Cd, Al, Cu, and Zn except Pb.

CHAPTER 1

INTRODUCTION

1.1 Background

Metals are non-biodegradable and are considered as major environmental pollutants causing cytotoxic, mutagenic and carcinogenic effects in animals (More *et al.*, 2003). Aquatic organisms have the ability to accumulate heavy metals from various sources including sediments, soil erosion and runoff, air depositions of dust and aerosol, and discharges of waste water (Labonne *et al.*, 2001; Goodwin *et al.*, 2003).

Therefore, accumulation of heavy metals in aquatic organisms can pose a long lasting effect on biogeochemical cycling in the ecosphere. Heavy metals can also adversely affect the growth rate in major carps (Hayat *et al.*, 2007).

The term heavy metal refers to any metallic chemical element that has a relatively high density and is toxic or poisonous at low concentrations. Examples of heavy metals include mercury (Hg), cadmium (Cd), arsenic (As), nickel (Ni), iron (Fe), and lead (Pb), and etc.