Health Risks Analysis of Lead due to the Consumption of Shellfish (Anadara. Sp) among the Coastal Communities in Makassar City

Agus Bintara Birawida1, Veni Hadju2, Sumbangan Baja3 and Armyn Nurdina4

1 Department of Environmental Health, Hasanuddin University, Makassar, Indonesia
2 Department of Nutrition, Hasanuddin University, Makassar, Indonesia
3 Department of Soil Science, Hasanuddin University, Makassar, Indonesia
4 Department of Medicine, Hasanuddin University, Makassar, Indonesia

Abstract - Lead is a highly toxic metal and has a very strong poison. The aim of the study is to determine the health risk of the lead exposure in Anadara sp to the coastal society of Makassar City. The method of the research is an observational study with a draft analysis of environmental health risks. The research was conducted from November 20, 2102 to May 28, 2013 in the coastal area of Makassar City. Shellfish samples taken in five districts, then lead content were measured with AAS (atomic absorption spectrophotometer) meanwhile body weight, intake rate, and frequency of exposure are quantitatively measured through questionnaires application interview. The analysis indicated that the highest lead concentration in Tallo was 275.97 µg/kg and the lowest concentration in Biringkanaya was 30.56 µg/kg. The results also revealed that for the Lead RQ (risk quotient) carcinogens was 42.20 % had an average of RQ < 1 and 57.80 % of respondents had RQ > 1. For Non-Carcinogenic RQ 8.90 % of respondents had an average of < 1 and 91.10 % had RQ value > 1.

Index Terms - Health risk analysis, Lead, Anadara sp

I. INTRODUCTION

Lead is a highly toxic metal and has a very strong poison. Lead is commonly found in the environment, especially near roads, mining areas, industrial sites, near power plants, incinerators, landfills, and hazardous waste disposal site. People who live near hazardous waste sites may be exposed to chemicals that contain lead through air, drinking water, eating food, and swallowing dust or dirt that contains lead (ATSDR, 2007).

Lead accumulation is the result of anthropogenic activity that has been concentrated the lead throughout the environment. Because lead is so widely spread throughout the environment, it can be found in everyone's body today. The magnitude of lead levels found today in most of people are greater than those of ancient times (Flegal, 1995). These levels are within an order of magnitude of levels that have resulted in adverse health effects (Budd et al. 1998).

Since lead is a neurotoxic accumulative, in young children lead can cause a decrease in the ability of the brain, whereas in adults exposure of lead can generate disorders of high blood pressure, as well as poisoning the other tissue. Some evidence of lead study since 1991 suggested that children's intellectual ability is adversely affected at blood lead concentrations < 10 mg / dL (Bellinger and Needleman 2003; Canfield et al., 2003a, 2004; Chiodo et al., 2004; Lanphear et al., 2000, 2005; Schnaas et al., 2006; Schwartz 1994; Surkan et al., 2007; Tellez - Rojo et al., 2006). Any increase in blood lead concentrations of 10 µg / dl potentially led to a decrease in IQ of 2.5 points, or 0.975 IQ scores (Widowati et al., 2008).

II. MATERIAL AND METHODS

2.1 Study area and Research design

This study was conducted at the coastal areas of Makassar. Site selection was done in five coastal districts such as districts of Tamalate, Mariso, Ujung Tanah, Tallo and Biringkanaya. These districts represent nine coastal districts in the city of Makassar which indicated exposure to heavy metals lead, Figure 1. We applied an observational study using an environmental health risks design analysis. This study was conducted in November 2012 - May 2013.