

UNIVERSITI TEKNOLOGI MARA

“DETERMINATION OF LEAD AND CADMIUM IN RAW AND
PASTEURIZED MILK IN RELATION TO HUMAN HEALTH RISK
ASSESSMENT: CASE STUDY IN THE STATE OF SELANGOR”

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Abstract

Introduction: Rapid pace of industrialization and urbanization that have occurred, especially in recent decades, have brought about in its wake changes in the lifestyles of Malaysians. These changes include dietary habits and food preferences which, in turn, have bearings on food production, food imports, food quality and safety from production to ready-to-eat stage (Lin 1998). Heavy metals can enter the human body through two main routes including through inhalation and ingestion, intake via ingestion depends upon food habit (Farid, 2004). Toxic metal content of milk and dairy product is due to several environmental conditions, the manufacturing process and the possible contamination during several steps of the manufacturing process (Anastasio, 2006). **Objective:** The objective of this study is to determine the level of lead and cadmium in raw cow's milk and pasteurized milk. **Methodology:** Forty nine sample of raw and pasteurized milk were taken and 100 questionnaires were also randomly distributed to obtain information on milk consumption and awareness level at different location in Selangor. The milk samples were treated with wet acid digestion and then are subjected to Atomic Absorption Spectrometry (AAS) for lead and cadmium trace (AOAC Official Method 999.11, 1999). Hazard Index (HI) was also determined. **Result:** There are violations of cadmium with the Food Act 1983 Standard of Heavy Metal for cadmium, 1mg/l. Analysis of the questionnaire shows significant level of awareness of heavy metal in milk ($p < 0.005$). HI is less than 1, no chronic effect anticipated. **Conclusion:** The level of lead is not detected and the level of cadmium violates the Food Act 1983 standard. The HI indicates the milk is safe for consumption and high awareness of heavy metal in milk. **Recommendation:** The perception of consumers needs to be changed in regards to milk safety and the manufacturing company need to comply with standards and requirements.

Keyword: Heavy Metal, Milk, Atomic Adsorption Spectrometry, Risk Assessment

CHAPTER 1

INTRODUCTION

1.1 Background

Rapid pace of industrialization and urbanization that have occurred, especially in recent decades, have brought about in its wake changes in the lifestyles of Malaysians. These changes include dietary habits and food preferences which, in turn, have bearings on food production, food imports, food quality and safety from production to ready-to-eat stage (Lin, 1998).

Milk and its product are very common in food list due to its nutrient value, since it is the source of vitamins and a lot of mineral constituents which are necessary for proper development and functioning of different tissue and organs (Farid, 2004). Cow's milk is an important foodstuff and is beneficial to human.

Milk is a complex bioactive substance to promote growth and development of the infant mammals. Cow's milk is widely consumed by human children and adults after the age of weaning. Among the nutrients of milk, calcium (Ca) has been well recognized by researchers and the public because of greater stature in children and less osteoporosis in old people (Qin, 2008).

Heavy metals can enter the human body through two main route including through inhalation and ingestion, intake via ingestion depends upon food habit (Farid, 2004). Heavy metals are widely disperse in the environment (Anastasio, 2006) and the increasing environmental pollution has given rise to the concern of the intake of heavy metals in food (Farid, 2004). Heavy metals in food pose potential healthy risk (Qin, 2008).