



Heavy metals, sources of food contamination and toxicity

Maryam Jalili

Assistant Professor, Food Technology and Agricultural Products Research Center, Food, Halal and Agricultural Products Research Group, Standard Research Institute (SRI),

maryamjalili@yahoo.com

ABSTRACT

Heavy metals are toxic, non-biodegradable substances able to enter the food chain through contamination of plant, water and environment. Some mineral elements such as Pb, Hg, Cd and As, are not suitable for biological functions and are positively toxic. Others, including Iron (Fe), Zinc (Zn), Nickel (Ni), and Copper (Cu) may play an essential role in human health, they can be categorized as heavy metals when they are found in food commodities beyond certain limits (Valko et al., 2005). Therefore, exposures to heavy metals through dietary intake have been identified as a public health concern by the U.S. Food and Drug Administration (FDA). Heavy metals may enter human body through the inhalation of air pollutants, consumption of contaminated drinking water, exposure to contaminated soils or industrial waste, and ingestion of contaminated food. Water may be contaminated by heavy metals through sources including, Natural sources, Anthropogenic sources, Domestic sewage, Industrial source, Urbanization, Agriculture source, Atmospheric source, Mining source. Crop contamination by heavy metals is related to some factors such as: Soil temperature, pH, organic matter, texture, microorganisms, cation exchange capacity, and presence of other metals, metals mobility, plant type, and transpiration rates. Different kind of food such as rice, wheat, vegetables (such as lettuce, potato, tomato, onion and so on), fruits, candy, spices, meat, fish, egg, and milk and dairy products are susceptible to heavy metals contamination. There are a lot reports about toxicity of heavy metals. Heavy metals cause serious impacts on human and animal health including reduced growth and development, cancer, organ damage, nervous system damage, and in extreme cases they may cause death. The focus of the current paper was to present information about heavy metals sources, toxicity, exposure in food and water, and legislation. Regarding the adverse effect of heavy metals, monitoring of heavy metals in soil, water and different kind of food is necessary. Moreover, application of different remediation techniques is necessary to reduce the toxic heavy metals pathway to the food chain and human body.

Keywords: Food chain, Heavy metals, Human contamination, Toxicity, Water,

1) Introduction

Based on scientific definition, heavy metals are a group of elements having a specific gravity above 5g/cm³, or atomic weights in the range of 63.5-200.6 g/mol which are toxic to humans even in minute quantities (Tekaya et al., 2013), because they are non-biodegradable or thermo degradable. Heavy metals are ubiquitous in nature (Ismail et al., 2014). However some mineral elements such as Iron (Fe), Zinc (Zn), Nickel (Ni), and Copper (Cu) may play an essential role in human health, they can be categorized as heavy metals when they are found in food commodities beyond certain limits (Valko et al., 2005). Others, such as Pb, Hg, Cd and As, are not suitable for biological functions and are positively toxic. These metals are listed