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A Review:

Lead content in milk and milk product

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INTRODUCTION

There is a steady increase in the processing of all types of heavy metals in industry and the household. Therefore, proper disposal, recycling and the regulation of the application of sewage to agricultural land have assumed great importance.

According to their nutritional role, the metals from food products can be divided in two categories: essential metals (*e.g.* Na, K, Ca, Cu, Zn, and Mn) and unessential metals (like Pb, Hg, Al, Sn, and Ag). For both categories, increasing of metal concentration in food over the limits can cause toxic effects for consumers of these products.

Lead is naturally present in normally all components of the environment and man takes lead from the air as well as food and drink. Increasing attention has been given in the recent years by the health authorities and public in general to the risk connected with contamination of the environment with heavy metals. Special attention has naturally been given to the content of the toxic trace elements in food.

Human exposure to lead comes from the main sources: using leaded gasoline, using lead-based paints, having lead pipes in water supply systems and exposure to industrial sources from processes such as lead mining, smelting and coal combustion. Additional sources of lead include soldered seams in food cans, ceramic glazes, batteries and cosmetics.

According to Ellen (1995) approximately 90 per cent of all lead emissions into the atmosphere are due to the use of leaded gasoline (Magda, 1996). Battery recycling is also an important source of lead exposure on a global scale, 63 per cent of all processed lead is used in the manufacturing of batteries. Lead-glazed pottery and lead pigments in children's toys and pencils are other routes of exposure. Lead solder in aluminium cans also pose significant risks. Lead can enter up in water and soils through corrosion of leaded pipelines in a water transporting system and through corrosion of leaded paints. It cannot to broken down; it can only converted to other forms.

Lead content in milk:

The concentration of lead in milk is a matter of special concern because milk is a major dietary constituent for infants. Extensive surveys have been made on lead concentrations in milk.

Walker (1980) determined the mean Pb contents in evaporated milk, homogenized cows' milk, dried skim milk and in human milk collected from Washington DC. (Data is presented in Table 1). Rodriguez *et al.* (1999) determined the concentration of Pb and Cd in samples of human, raw and pasteurized cow and goat milk and dried infant formula. (Data is summarized in Table 1 and 2) and they concluded that the concentration of Pb in different milk did not present any risk to human health.

Mean Pb in milk of 92 Bulgarian Simmental (BS); 92 BS x Ayrshire and 84 Black Pied cows during 1 year was 0.332 to 0.441; 0.348 to 0.453 and 0.369 to 0.533 mg/kg, respectively (Petrakiev *et al.*, 1983). Orlando *et al.* (1998) determined the contents of Pb and other heavy metals in cow milk and dried milk and they observed that the contents of Pb were below the detection limit for cow milk. Cerkvenik *et al.* (2000) examined the residues of trace elements in 188 samples of raw cow milk from 19 dairy locations (in Slovenia) during 1994 to 1998 and they reported that the Pb contents in all samples corresponded to tolerance level (0.1 mg/kg) and 98 % of these samples <0.05 mg/kg.

Mean concentration of Pb in milk in cows with clinical and subclinical mastitis was 0.35 ± 0.03 or 0.42 ± 0.04 ppm (Ram Naresh *et al.*, 1999) Imparato *et al.* (1999) found that the cow milk was of good quality with low levels of contamination of Pb, while studying the Pb and Cd contents in 234 samples of cow milk from dairy farms in the Avellino region, Campania, Italy. Milk from 30-38 Peking Black Pied cows which were in the first 4 months of 2^{nd} – 4^{th} lactation contained Pb – 0.009 ± 0.0046 ppm (Wun *et al.*, 1981)

Vega *et al.* (1977) observed that the lead contents in 20 tins of protein-enriched and 20 vitamin-enriched evaporated milk was 38.4 ± 11.4 and 35.0 ± 4.5 mug/100

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