

DETERMINATION OF HEAVY METALS CONCENTRATION IN HONEY AND FISH USING MS–ICP MODEL

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Summary. The concentration of microelements that can cause toxic danger, including heavy metals in nutritional products, is regulated by establishing tolerable limits of their concentration. The general parameters of safety of nutrition products are regulated by the Lithuanian Standards of Hygiene (LSH) HN 54:2001.

The aim of this work was to determine the concentration of Pb, Cd, Cu, Zn, Sr, Rb, Ba and Ce, La, U in Lithuanian honey and freshwater fish, using ICP-MS model “Element” (Finnigan MAT). It was established, that the concentration of heavy metals in Lithuanian honey vary in a large range: Pb $2.9 \div 22.1$ $\mu\text{g}/\text{kg}$, Cd $4.1 \div 14.6$ $\mu\text{g}/\text{kg}$, Cu $119.6 \div 342.9$ $\mu\text{g}/\text{kg}$, Zn $514.0 \div 5638.6$ $\mu\text{g}/\text{kg}$. The determined amounts of deleterious microelements stay within the MTL of LSH. The amounts of heavy metals determined in Lithuanian honey were lower compared to honey of other EU Countries. According to Rb amounts in honey, it can be assorted into honey of grassland and forest. 2446.5 $\mu\text{g}/\text{kg}$ of Rb was found in honey, which was collected in forest of Labanoras. This amount was by 4 \div 12 fold higher compared to remaining samples of honey. Considering to the correlation between the concentration of heavy metals, honey could be the indicator of environmental pollution.

The fixed concentrations of Pb in fish flesh samples were below the maximum tolerable level of LSH, although one sample was contaminated with 2.125 mg/kg Pb, which was by 5 fold above the standard; however, 40% of fishflesh samples were contaminated with Pb exceeding the MTL value of the European Union (0.2 mg/kg). Further, in those fish flesh samples the Cd concentration transcendent the Lithuanian MTL (0.14 mg/kg) value was established. 45% of fish flesh samples were contaminated with the concentration of Cd exceeding the MTL value of the European Union (0.05 mg/kg).

It was established that concentrations of Pb, Cd, Cu and Zn in fishbone corresponded to the allowable standards for fodder additives, processed from the fish products and other sea organisms. The amount of Pb, Cu and Zn in fish bone was higher than in fish flesh, except for Cd, where the concentration in bone was slightly lower compared to fish flesh .

The results of this work obligate to control the amounts of heavy metals in honey and fish, regularly.

Key words: heavy metals, pollution, mass spectra.