

Heavy Metal Contents in Vegetable Oils of Kazakhstan Origin and Life Risk Assessment

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Abstract : The accumulation of heavy metals in food is a constant problem in many parts of the world. Vegetable oils are widely used, both for cooking and for processing in the food industry, meeting the main dietary requirements. One of the main chemical pollutants, heavy metals, is usually found in vegetable oils. These chemical pollutants are carcinogenic, teratogenic and immunotoxic, harmful to consumption and have a negative effect on human health even in trace amounts. Residues of these substances can easily accumulate in vegetable oil during cultivation, processing and storage. In this article, the content of the concentration of heavy metal ions in vegetable oils of Kazakhstan production is studied: sunflower, rapeseed, safflower and linseed oil. Heavy metals: arsenic, cadmium, lead and nickel, were determined in three repetitions by the method of flame atomic absorption. Analysis of vegetable oil samples revealed that the largest lead contamination (Pb) was determined to be 0.065 mg/kg in linseed oil. The content of cadmium (Cd) in the largest amount of 0.009 mg/kg was found in safflower oil. Arsenic (As) content was determined in rapeseed and safflower oils at 0.003 mg/kg, and arsenic (As) was not detected in linseed and sunflower oil. The nickel (Ni) content in the largest amount of 0.433 mg/kg was in linseed oil. The heavy metal contents in the test samples complied with the requirements of regulatory documents for vegetable oils. An assessment of the health risk of vegetable oils with a daily consumption of 36 g per day shows that all samples of vegetable oils produced in Kazakhstan are safe for consumption. But further monitoring is needed, since all these metals are toxic and their harmful effects become apparent only after several years of exposure.

Keywords : vegetable oil, sunflower oil, linseed oil, safflower oil, toxic metals, food safety, rape oil

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