UDC 664.8.014 / .019: 663.95

**Content of Heavy Metals In Certain Vegetables, Citrus Fruits and Tea Leaves Produced In The Republic of Azerbaijan and Their Pocessing Products**

**Abstract:** Due to the fact that the relevance of food safety issues is increasing every year, this article highlights the results of analyzes of the content of toxic metals (Zn, Cd, Pb, Cu) in plant materials grown in the Lankaran economic region of the Republic of Azerbaijan and their processing products ... Measurements of mass concentrations of Zn, Cd, Pb and Cu were performed by stripping voltammetry after preliminary preparation of samples by "wet" mineralization. The stripping voltammetry method is based on the ability of the elements accumulated on the working electrode from the analyzed solution to dissolve electrochemically at a certain potential characteristic of each element. The registered maximum anode current of the element is linearly dependent on the concentration of the element to be determined. The process of electron accumulation (electrolysis) on the working electrode takes place at a certain electrolysis potential for a given time. It was found that a relatively high concentration of Zn, Pb, Cu 2.90 ± 1.10 mg / kg, 0.11 ± 0.040 mg / kg, 3.10 ± 1.10 mg / kg, respectively, were found in green tea leaves, and a relatively high content of Cd concentrations of 0.036 ± 0.014 was found in tea drinks made from black long tea. And the lowest Zn content is 0.0033 ± 0.14 mg / kg; Cd 0.00098 ± 0.00015 mg / kg; Pb 0.012 ± 0.0041 mg / kg; Cu 0.054 ± 0.020 mg / kg were found, respectively, in lemon juice, canned cucumbers, fresh oranges and black tea drinks. The content of mass concentrations of toxic metals Cd, Pb in all analyzed samples of tea leaves, vegetables (cucumbers and eggplants) and citrus fruits (lemons and oranges) is less than their permissible levels specified in the current regulatory documents. The content of mass concentrations of toxic metals Zn, Cu in fresh vegetables, citrus and tea leaves is not standardized by these standards.

**Key words:** vegetables, citrus fruits, tea leaf, toxic metals, health, food safety

**References**

Boev V. M. Ximiceskiye kanserogeni sredi obitaniya i zlokacestvenniye obrazovaniya [Chemical carcinogens of the environment and malignant formations]. «Медицина». ["Medicine"], 2002. Pp. 344.

Vasilovsky A. M., Kurkatov S. V. Gigieniceskaya otsenka bezopasnosti prodovolstvennogo sirya v Sentralnoy Sibiri [Hygienic assessment of the safety of food raw materials in Central Siberia]. XI All-Russia. congress of hygienists and sanitary doctors. M., 2012. Vol. 3. P. 57-60.

Litvinova O.S. Razrabotka podxodov k opredeleniyu prioritetnix kontaminantov ximiceskoy prirodi v pishevix produktax v rejime idealnogo vremeni s tselyu optimizasii sanitarno-epidemiologiceskogo nadzora [Development of approaches to the identification of priority contaminants of a chemical nature in food in real time to optimize sanitary and epidemiological surveillance]. Author's abstract. dis. ... Cand. honey. sciences. - M., 2013. 23 p.

Pavlov N. N. Riski dlya zdorovya detey I podrostkov, obuslovlenniye kontaminatsiey pishevix produktov I sirya mestnogo proizvodstva [Risks to the health of children and adolescents due to contamination of food and local raw materials]. Dis. …of cand. of med. sciences. Volgograd, 2014. 150 p.

Frolova O. A. Gigiyeniceskaya otsenka riska zdorovyu naseleniya, formiruyushegosya pod vozdeystviyem kontaminantov, zagryaznyayushix pisheviye produkti (na primere respubliki Tatarstan) [Hygienic assessment of the health risk of the population formed under the influence of contaminants that contaminate food (on the example of the Republic of Tatarstan) // Profilakticeskaya meditsina [Preventive medicine]. 2012. No. 3. P. 34-36.

Khotimchenko S. A. Ispolzovaniye konseptsii analiza riska v sisteme monitoringa za bezopasnostyu pishevix produktov [Using the concept of risk analysis in the monitoring system for food safety] // Mater. X Vseros. congress of hygienists and sanitary doctors. - M., 2007. Book. I. P. 1054-1055.

 Alexander P. D., Alloway B. J., Dourado A. M. Genotypic variations in the accumulation of Cd, Cu, Pb and Zn exhibited by six commonly grown vegetables // Environ. Pollut.2006, Vol. 144. P.736–745.

 Berihun T. B., Amare1 E. D., Raju R. P., Ayele T. D., Dagne H. Determination of the Level of Metallic Contamination in Irrigation Vegetables, the Soil, and the Water in Gondar City, Ethiopia // Nutrition and Dietary Supplements. 2021, Vol. 13. P. 1–7. http://doi.org/10.2147/NDS.S283451.

 Dolan S. P. Analysis of dietary supplements for arsenic, cadmium, mercury and lead using inductively coupled plasma mass spectrometry / S. P. Dolan, D. A. Nortrup, P. M. Bolger, S. G. Capar // J. Agric. Food Chem. 2003. Vol. 51, №5. P. 1307-1312.

 Feseha A., Chaubey A. K., Abraha A. Heavy metal concentration in vegetables and their potential risk for human health // Health Risk Analysis. 2021, №. 1. P. 68–81. DOI: 10.21668/health.risk/2021.1.07.eng

 Harmanescu M., Alda L. M., Bordean D. M., Gogoasa L., Gergen L. Heavy metals health risk assessment for population via consumption of vegetables grown in old mining area, a case study: Banat County, Romania // Chem. Cent. J. 2011, Vol. 5. P. 64–73.

 Jarup L. Hazards of heavy metal contamination // British Medical Bulletin. 2003. Vol. 68, Issue 1. P. 167-182.

 Jia Z., Li S., Wang L. Assessment of soil heavy metals for eco-environ- ment and human health in a rapidly urbanization area of the upper Yangtze Basin // Sci Rep. 2018. Vol. 8, Issue 1. P. 1–14.

Maharramov M. A. Theoretical bases of food technology. Baku. "University of Economics" Publishing House. 2015. 384 p. (in Azerbaijan).

Mahurpawar M. Effects of heavy metals on human health // Int J Res Granthaalayah. 2015, Vol. 530. P. 1–7.

Mamtani R., Stern P., Dawood I., Cheema S. Metals and disease: A global primary health care perspective // *J Toxicol*. 2011. 2011.319136.

Mishra S., Bharagava R. N., More N., et al. Heavy metal contamination: an alarming threat to environment and human health // Environ Biotech. 2019. P. 103–125.

Monisha J., Tenzin T., Naresh A., Blessy B. M., Krishnamurthy N. B. Toxicity, mechanism and health effects of some heavy metals // Interdisciplinary Toxicology. 2014. Vol. **7**, Issue 2. P. 60-72.

Qu C., Ma Z., Yang J., Liu Y., Bi J., Huang L. Human Exposure Pathways of Heavy Metal in a Lead-Zinc Mining Area //Heavy Metal Contamination of Water and Soil: Analysis, assessment, and remediation strategies. 2014. P. 129–156.

Rahman M. A., Rahman M. M., Reichman S. M., Lim R. P., Naidu R. Heavy metals in Australian grown and imported rice and vegetables on sale in Australia: Health hazard // Ecotoxicol. Environ. Saf*.* 2014. Vol. 100. P. 53–60.

Säumel, I., Kotsyuk I., Hölscher M., Lenkereit C., Weber F., Kowarik I. How healthy is urban horticulture in high traffic areas? Trace metal concentrations in vegetable crops from plantings within inner city neighbourhoods in Berlin, Germany // Environ. Pollut. 2012. Vol. 165. P. 124–132.

Sharma A, Katnoria J. K., Nagpal A. K. Heavy metals in vegetables: screening health risks involved in cultivation along wastewater drain and irrigating with wastewater // SpringerPlus. 2016. Vol. 5, Issue1. P. 1–16. doi:10.1186/s40064-016-2129-113

Tchounwou P.B., Yedjou C.G., Patlolla A.K., Sutton D.J. Heavy metal toxicity and the environment // Experiential Sup- plementum. 2012. Vol. 101. P. 133–164. DOI: 10.1007/978-3-7643-8340-4\_6

Yang Y., Zhang F. S., Li H. F., Jiang R. F. Accumulation of cadmium in the edible parts of six vegetable species grown in Cd-contaminated soils // J. Environ. Manag. 2009. Vol. 90. P. 1117–1122.

Zhou H., Yang W., Zhou X., Liu L., Gu J., Wang W., Zou J., Tian T. , Peng P. and Liao B. Accumulation of Heavy Metals in Vegetable Species Planted in Contaminated Soils and the Health Risk Assessment // Int. J. Environ. Res. Public Health 2016. Vol. 13, Issue 289. P. 1- 12. doi:10.3390/ijerph13030289.