

SCIENTIFIC OPINION

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regarding a dissertation work on the topic **"Study of the content of total mercury in different media of importance for human health and the environment"** of main expert Daniela Stankova - Kostadinova, "Chemical Factors" department at the "Analytical and laboratory activities" directorate, according to order No. RD-21/15.01.2024 of the Director of the National Center of Public Health and Analyses.

The presented dissertation is on a current and important topic for human health. Mercury is a non-essential element for the human body, defined by the World Health Organization as one of the ten most toxic chemical substances, for which there are no safe levels of exposure. Due to its wide use, mobility and high toxicity, mercury causes serious environmental pollution.

The quantification of mercury in different media (cosmetic products, food and nutritional supplements, waters, soils, sediments, polymeric materials and products, etc.) and the data on their use are the basis of the assessment of the health risk arising from the intake of this toxic element.

The aim of the dissertation work is to optimize and validate methods for the determination of total mercury by a direct analyzer of solid and liquid samples and to apply them to the assessment of the safety of various media of importance for human health and the environment.

The dissertation is presented in 121 pages, contains 39 tables and 15 figures. 214 publications were used for literature reference.

The physico-chemical properties of mercury are discussed in the literature review; occupational and non-occupational mercury exposure; the toxic effect of elemental mercury, inorganic mercury and organic mercury; the content of mercury in various media (water, food and nutritional supplements, cosmetic products, soils and sediments, polymeric materials); the regulatory limits for mercury content in different matrices and analytical methods for its determination.

In order to achieve the aim of the dissertation, tasks related to the optimization and validation of methods for determining total mercury with a direct analyzer and researching the content of total mercury in various media of importance for human health and the environment (cosmetic products, food and food additives, waters, soils and sediments, polymeric materials) are set.

The materials and methods related to the analysis of a total of 2583 samples from different matrices are exhaustively described: cosmetic products - 1051 samples, food and nutritional supplements - 227 samples from different food groups, water - 998 samples, soils - 104 samples, sediments - 109 samples, products from polymer materials - 94 samples.

It is important to note the successful participation in three interlaboratory competency tests for the determination of mercury in food, food additives and sewage sludge.

The discussion of the results presents comprehensively and graphically through tables and figures the significant volume of the performed analytical activity, the systematization and summarization of the obtained data. The summarized results of the study show that the tested

cosmetic products, waters, food and nutritional supplements, soils, sludges for agricultural utilization, products made of polymeric materials, in terms of mercury content, are safe for use and are not risk to public health. It should be noted that cosmetic products for hair, face and body and cosmetic products for oral hygiene contain mercury above the limit of quantification of the analytical procedure. Due to the frequency of application, the application of several layers, as well as the large body surface to which they are applied, the mercury content of these products must be monitored, since on the one hand, values close to the detection limit are considered to mean that cosmetics are safe, but on the other hand, mercury is a toxic element that accumulates, so exposure to even a small amount is dangerous to human health. There is no theoretical safe level for this highly toxic element and any concentration above the detection limit is dangerous.

The contributions of the dissertation are in several aspects.

- For the first time in Bulgaria, extensive studies have been carried out on the content of mercury in different media of importance for human health and the environment: cosmetic products, water, food and nutritional supplements, soils, sediments for use in agriculture, products made of polymer materials, by applying an optimized and validated EPA 7473 "Method for Direct Determination of Mercury in Solid and Liquid Samples.

- A large number of data have been obtained to establish the levels of mercury contamination of cosmetic products, water, food and nutritional supplements, soils, sediments for use in agriculture, products made of polymeric materials. Compliance with the requirements of European and national legislation regarding mercury content in the studied media was assessed.

- The summarized and systematized information on the presence of mercury in the studied matrices can be used in fulfilling Bulgaria's commitments in implementing the Minamata Convention on mercury and Regulation (EU) 2017/852 on mercury.

- Collected data on mercury content in media important for human health and the environment can serve to accumulate a database of mercury content in the studied matrices and take preventive actions.

- The resulting data on mercury content provide quantitative information on the actual mercury exposure of the population and can be used to estimate the mercury exposure for the population from the analyzed media.

There are 5 publications and 9 scientific reports from participation in scientific forums on the subject. The volume of analytical work performed even exceeds that required for a dissertation for an educational and scientific degree PhD. Therefore, I propose to the respected members of the Scientific Jury to award main expert Daniela Stankova-Kostadinova, PhD student of independent training, the educational and scientific degree PhD in the Higher Education Department 7. Health and Sports, Professional Direction 7.1. Medicine, Scientific specialty "Hygiene" with the topic of the dissertation work "Study of the content of total mercury in different media of importance for human health and the environment" with scientific supervisor assoc. prof. Rossitsa Georgieva, PhD.


/ assoc. prof. Vera Pavlova, PhD/

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