ICAPP 2022
2nd International Conference
on Advanced Production and Processing

ARSENIC IN FEMALE CATTLE LIVERS AND KIDNEYS FROM VOJVODINA, NORTHERN SERBIA

***Vesna Ž. Đorđević*[1], Vladimir M. Tomović[2], Milana M. Lazović[3], Ivana M. Vasiljević[3], Marija R. Jokanović[2], Branislav V. Šojić[2], Snežana B. Škaljac[2], Dragan D. Vujadinović[4], Mila S. Tomović[5]**

[1]Institute of Meat Hygiene and Technology, Kaćanskog 13, Belgrade, Serbia; [2]University of Novi Sad, Faculty of Technology Novi Sad, Bulevar cara Lazara 1, 21000 Novi Sad, Serbia; [3]A BIO TECH LAB d.o.o., Vojvode Putnika 87, 21208 Sremska Kamenica, Serbia; [4]University of East Sarajevo, Faculty of Technology Zvornik, Karakaj 34a, 75400 Zvornik, Bosnia and Herzegovina; [5]Technical School Pavle Savić, Šajkaška 34, 21000 Novi Sad, Serbia

Abstract

Arsenic (As) occurs naturally in the environment and is present in soil, ground water and plants. As occurs in a broad variety of As compounds, of which inorganic As is the most toxic form. Inorganic As has been classified by the International Agency for Research on Cancer in group 1 as carcinogenic to humans. The European and Serbian legislation has established maximum permissible levels for inorganic As only in rice and rice products. EFSA panel on contaminants in the food chain (CONTAM) established a tolerable weekly intake (TWI) for As of 15 µg/kg body weight. Samples (liver and kidney) were collected from 26 cattle slaughtered at the slaughterhouse in Novi Sad (Vojvodina, northern Serbia), during 26 consecutive weeks (i.e. samples from one animal per week were collected). All animals were slaughtered for human consumption. Slaughtered heifers and cows (female cattle) came from 26 different farms for milk production (i.e. one animal per farm was sampled) in Vojvodina (northern Serbia), so it can be stated that samples of liver and kidney were collected from the whole region. Information about animals (date of birth, sex and type of the animal) were received from farms with copy of the passport. The investigated cattle aged from 412 to 2502 days. Samples (liver and kidney) were collected from the same cattle and minced in a stainless-steel cutter. After homogenization, approximately 250 g of samples were taken for analysis. Samples were vacuum packed in polyethylene bags and stored at constant temperature (-80°C) until determination of As. As content was determined using ICP-OES (inductively coupled plasma-optical emission spectrometry) method, after digestion by microwave. A strict analytical quality control programme was employed during the study. The As concentrations in the livers and kidneys ranged from below detection limits (LOD < 0.0030 mg/kg) to 0.0246 mg/kg wet weight and from below detection limits (LOD < 0.0030 mg/kg) to 0.0432 mg/kg wet weight, respectively. Thus, content of As in edible offal (liver and kidney) can be used as relevant indicator of environmental contamination by As. Generally, monitoring and control of As in living organisms, i.e. red meat and edible offal, is necessary.

Keywords: arsenic, liver, kidney, cattle, Vojvodina

Acknowledgements: This research was funded by the Ministry of Education, Science and Technological Development, Republic of Serbia, under Grant 451-03-68/2022-14/200134.