

BOOK OF ABSTRACTS

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D-1 CURRENT IODINE INTAKE AMONG CHILDREN AND WOMEN OF REPRODUCTIVE AGE IN KAZAKHSTAN

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Background. Iodine deficiency is a global problem representing the most common preventable cause of mental retardation. In 2003 the Republic of Kazakhstan (RK) was one of the first countries of CIS region adopted the Law on mandatory iodization of table and cattle salt and in 2010 the country was certified as reached universal salt iodization (USI). So there was the necessity to clear up current iodine situation among population of Kazakhstan.

Objectives. To assess the iodine status among children of 6–59 months and women of reproductive age (15–49) in three regions of the Kazakhstan Republic in 2012.

Methods. A population based cross sectional study was surveyed to analyze data of iodine intake among 6-59 months children (n=720) from Akmola (n=250), East Kazakhstan (n=258), South Kazakhstan (n=212) regions and non pregnant women of 15-49 reproductive age (n=701) of Akmola (n=240), East Kazakhstan (n=240), South Kazakhstan (n=221) regions. Urinary iodine excretion (UIE) was measured in casual urine samples and iodine intake was defined using ammonium persulfate digestion with spectrophotometric detection of the Sandell-Kolthoff reaction in resource iodine lab which successfully participated in external quality control program EQUIP (CDC, Atlanta) from 2002. The women were interviewed about salt iodization issue. Results. The median UIEs of children of Akmola, East Kazakhstan and South Kazakhstan regions were 240.3 µg/L, 207.4 µg/L and 153.5 µg/L respectively and non pregnant women of reproductive age were 258.2 µg/L, 191.9 µg/L, and 150.8 µg/L. The percentage of iodine deficient (UIE<300 µg/L) children were 33.3% and non pregnant women of reproductive age were 27.9% in the three regions. The analysis of the questionnaires revealed 2.3% (18) of children and 3.0% (21) of women were used iodine preparations during last month.

Conclusion. In this study, iodine status in children and women of the target three regions was not in stable position. There was prevalence of iodine deficiency and excess iodine intake among children and women of the population. According to the international criteria significance level of iodine deficiency in non-pregnant women aged 15–49 years in Kazakhstan in 2012, exceeding the 20%-ing point of reference is classified as a moderate risk to public health. It indicates the necessity for periodic biological monitoring and continuing communication activity with population on long-term basis.

Keywords: Iodine intake, children, women of reproductive age, urinary excretion

D-2 ULTRA-HIGH PERFORMANCE LIQUID CHROMATOGRAPHY COUPLED WITH MASS SPECTROMETRY AS A TOOL FOR RAPID AND RELIABLE DETERMINATION OF FREE AMINOACIDS IN FOOD MATRICES

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Analysis of amino acids composition and their quantification is very important in terms of the assessment of nutritional values of food products, control of nutritional claims declared by dietary supplements producers. Up to now, high-performance liquid chromatography (HPLC) coupled with conventional detectors (UV, FLD), which includes the pre-/post-column derivatization of analytes, have been the most widely used technique. Nevertheless, nowadays, using of time-saving methods omitting the derivatization steps based on ultra-high performance liquid chromatography coupled with mass spectrometric systems continues to increase. Our study describes a rapid and sensitive analytical method for determination of free amino acids in food and foodstuff matrices. Because of the considerable polarity of amino acids, hydrophilic interaction chromatography (HILIC) was chosen for their effective separation. 22 underivatized amino acids were separated on Atlantis HILIC Silica column (100 x 3 mm; 3 µm) by gradient elution in the system of acetonitrile/water. For the detection, two types of mass spectrometric instrumentations were tested (i) high resolution mass spectrometer with orbitrap mass analyzer (Exactive, Thermo Fisher Scientific), and (ii) tandem mass spectrometer with hybrid quadrupole-ion trap mass analyzer (Q-trap 5500, AB Sciex). With regard to relatively high concentrations of amino acids present in food or dietary supplements, the quantification limits achievable were not the most important and decision making criterion. With regard to the full spectral information provided by the orbitrapMS system, the U-HPLC-orbitrapMS method was chosen as a better alternative in this study. Additionally to the target amino acid analysis, identification of their food-processing degradation products would be possible. Regarding the sample preparation, it differed in dependence of food matrix character. Liquid samples (protein hydrolyzates or beer) were just diluted into the acetonitrile (solvent compatible with the HILIC chromatography) and directly analyzed. Water-soluble dietary supplement samples were firstly diluted in water, and then diluted into the acetonitrile. Other water-insoluble matrices (e.g. vegetables, cereals, etc.) have to be extracted with the 0,2mM acetic acid. Within the U-HPLC-orbitrapMS method validation, repeatabilities of the method expressed as relative standard deviations (RSDs, %) were determined. For liquid or water soluble matrices the internal reference material of beer containing almost full spectrum of basic amino acids was used, the RSD values ranged between 3.8 and 6.2 %. For solid samples, where the extraction step had to be included, the RSDs were slightly higher, but not exceeding 9%. Recoveries of analytes were examined only in the case of solid samples, where the extraction of analytes was needed. For quality assurance of the method, sample of internal reference material (hydrolyzed collagen sample) was enabled.

Keywords: Amino acids, hydrophilic interaction chromatography, ultra-high-performance chromatography, high resolution/tandem mass spectrometry

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