

Streszczenie w języku angielskim

Proper nutrition and a physical activity level that meets current recommendations are key factors in maintaining optimal human health. A well-composed diet should provide adequate energy, limit saturated and trans-fatty acids, salt and sugar. The intake of vegetables, fruits, legumes and whole grain cereal products, especially unprocessed cereals, is also important. The appropriate choice of products, especially cereals, is important among patients with gluten-related conditions. A wide range of cereals and pseudo-cereals that naturally do not contain gluten proteins are currently available. These include buckwheat, millet, maize, quinoa, oats and rice. In addition to providing the body with essential nutrients and minerals, food is one of the main routes of exposure to toxic elements. The aim of this research was to evaluate naturally gluten-free products in terms of selected health and toxicological aspects. The research material consisted of a total of 341 products obtained from 6 types of cereals and pseudo-cereals: buckwheat, millet, oats, quinoa, maize and rice. Preparation of the samples for elemental analysis involved homogenising the samples and performing microwave mineralisation in a closed system. Mineral content (Ca, Mg, Fe, Zn, Cu, Mn and Se) was analysed using the atomic absorption spectrometry (AAS) technique. It was assessed whether the tested products could be used as a source of the analysed minerals in the diet of European adults and their upper tolerable intake level (**P.2**) was estimated. The content of toxic elements (As, Cd and Pb) in the study material was determined using inductively coupled plasma mass spectrometry (ICP-MS). The AAS method using the amalgamation technique was used for the determination of Hg content. Accuracy control of the methods used was performed using certified reference materials. The obtained results were subjected to statistical analysis. An evaluation of the safety of consumption of the tested products in terms of exposure to toxic elements was carried out using mathematical models taking into account the possible short- and long-term risk of adverse effects as a result of exposure to As, Cd, Pb and Hg (**P.1, P.3**). It was observed that all the products studied could be a source of Cu, and rice products an additional source of Cu, Mn and Se in the diets of European adults. Taking into account the upper tolerable level of intake of the studied minerals and the content of these elements in the tested products, the risk of adverse health effects associated with their consumption is low. Moreover, naturally gluten-free products available on the Polish market can be considered safe for consumption in terms of exposure to As, Cd, Pb and Hg. Exceedances of currently established limits have only been reported in individual samples. This is the first time that the safe consumption of such a large group of naturally gluten-free cereal products has been assessed. The results of this investigation indicate that there is a need to monitor the content of toxic elements not only in cereal products, but also in other groups of food products included in the average daily diet of Polish citizens and to determine the daily intake of As, Cd, Pb, and Hg. It is also important to set maximum limits for As and Hg in cereal products other than rice. These activities can contribute to increasing food quality and safety. In addition, it is also important to assess the risks and possible health effects resulting from exposure to toxic elements in food. The results of this investigation can be included in the scientific opinions of the European Food Safety Authority regarding the assessment of exposure to As, Cd, Pb and Hg from food. Action to reduce exposure to toxic elements is extremely important from a public health perspective.