

## Summary of the doctoral thesis of Anna Katarzyna Kojta

Man collects, cultivates and utilizes mushrooms in different ways for thousands of years. Bay bolete (*Imleria Badia*) is one of about four thousand edible mushrooms species and over forty thousand of all macrofungi. Advances in analytical chemistry and technical capabilities enable today, as never before, more detailed studies of the chemical composition, nutritional and medicinal properties of mushrooms, the interdependence between their composition and the geochemical soil background and anthropogenic factors, etc. However, there are large gaps in the knowledge of the elements composition and other biologically active fungal components - which is the derivative, among others, of high biodiversity and extent of occurrence in the world. The content of mineral components - bio-elements and harmful elements, their ability to bio-accumulate, interdependent impact, influence of the geochemical composition of the soil substrate remain unknown for most edible mushrooms species as well as for the others. Much less is known about the impact of the culinary treatments process on minerals contained in mushrooms and even less about their bioaccessibility from dishes composed from mushrooms.

The doctoral thesis, for the first time, presents the results of the bioaccessibility of Al, Ba, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Rb, Sr, and Zn in culinary processed fruiting bodies of *Imleria badia*. So far, studies of nutrients bioaccessibility in the case of mushrooms (mostly *Agaricus spp.*) were limited to As and Cd (raw and blanched mushrooms) and Cr, Cu, Ni, Pb, Se and Zn (raw mushrooms).

The objectives of the doctoral thesis were to determine the effect of culinary treatment on the mineral content in the fruiting bodies of *Imleria badia* and bioaccessibility of elements consumed with mushrooms in the human digestive tract. *Imleria badia* is a popular and valuable species of mushrooms, processed on a large scale in the food industry and also commercially available not only in the form of fresh, but also as dried, frozen or pickled. During the research 110 pooled samples of *Imleria badia* taken from nine forested areas of the Polish territory and 94 samples of surface soil underneath the fruiting bodies were collected and analyzed. The collected samples were analyzed for the:

- content of elements
- impact of culinary processing on elements content
- bioaccessibility (the fraction of the studied compound released from the food in the GI tract and potentially absorbed in the intestine) of elements.

Studies have shown that culinary treatment causes a significant loss not only of their weight but also of the contained elements. Only a part of the analyzed minerals contained in the fruiting bodies of studied mushroom are potentially available in the human digestive tract and the individual elements contained in the fruiting bodies differ in their bioaccessibility. On the basis of the obtained information about the mineral composition of the tested raw material and mushroom products, as well as their bioaccessibility degree, the value of nutrition and health consequences of the occurrence of trace elements in *Imleria badia* has been assessed.

The obtained results on the relative elements bioaccessibility from culinary processed fruiting bodies of *Imleria badia*, is one of the first of this kind results presented in the world, what has a very significant impact on the discipline. In addition, the undertaken analysis contribute to research on food quality and they fit in with the European Commission's action in support of solutions limiting the use of animals in research. The bioaccessibility is an important issue not only from the point of view of toxicology, pharmaceutics or food technology and nutrition, but also for economics.