Biologically Active Substance Content in Edible Plants of Zakarpattia and Their Elemental Composition Model

- [Tamara Meleshko](#),
- [Roman Rukavchuk](#),
- [Larysa Buhyna](#),
- [Oleksandra Pallah](#),
- [Sergii Sukharev](#),
- [Volodymyr Drobnych](#) &
- [Nadiya Boyko](#)

Abstract

Consumption of edible plants satisfies a significant part of human body needs in macro- and micronutrients while biologically active substances contain strong antioxidant properties and reduce the risk of a number of diseases. Balanced nutrition and design of personalized diets and treatment rely on the data on the content of macro- and micronutrients and biologically active substances. We determined polyphenol and anthocyanin content in 22 species of local edible plants using modified spectrophotometric method with Folin–Ciocalteu reagent as well as chemical elements' content in a mixture of edible plants from 13 regions using standard procedures. We performed correlational analysis of the obtained data and analysis of the main components in OriginLab, developed regional models of chemical elements' content for a mixture of edible plants, and conducted cluster analysis using common tools in Python. The results of biologically active substances' study demonstrated that the highest content of polyphenolic compounds and anthocyanins was found in grape meal of *Vitis vinifera* L. The study of chemical elements' content demonstrated that edible plants from lowland areas are the best and revealed clear dependences of the elements on each other and geographical conditions. The analysis of the principal components confirmed this finding. Based on the obtained data, a number of regional models of chemical elements' content in a mixture of edible plants were built, tested, and evaluated. Obtained results are the basis for designing various diets, filling composite databases of the region's food, and creating the newest biologics—pharmabiotics.