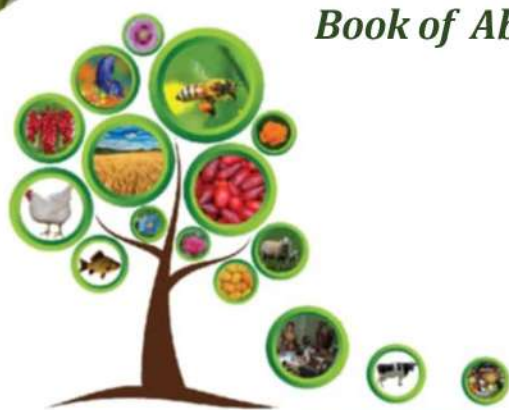
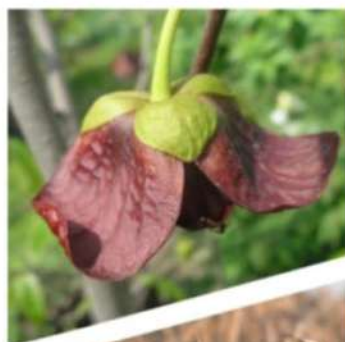




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**AGROBIODIVERSITY FOR
IMPROVING THE NUTRITION, HEALTH,
QUALITY OF PEOPLE LIFE
AND NATURE**

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Institute of Food Sciences



Botanical Garden of Ivan Franko
National University of Lviv

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RED OAK (*QUERCUS RUBRA* L.) FRUITS AS A SOURCE OF MINERAL ELEMENTS

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An urgent issue today is the search for new natural sources rich in biologically active compounds that contribute to the human health improvement. In particular, according to Food and Agriculture Organization data, it is known that more than 2 billion people have micronutrient deficiencies.

Minerals and microelements are an integral part of the normal functioning of the human body. They regulate the activity of enzymes, conduct nerve impulses, act as catalysts of chemical processes, are part of vitamins, hormones, and pigments, and determine their biological activity.

Quercus rubra L. (red oak) is a deciduous tree from the Fagaceae family that was brought to Europe from North America. Due to the high content of biologically active substances (BAS), in particular: phenolic compounds, essential amino acids, fats, proteins, starch, etc.; it is also used in folk and official medicine as a plant with antioxidant, anti-inflammatory, antimicrobial, and antitumor activity.

The recent studies highlight the possibility of using acorns (fruits of the red oak) in food products (as a substitute for cocoa or coffee, as well as a new ingredient for the production of bread and confectionery), in nutraceuticals and pharmaceuticals.

This work aimed to investigate the content of mineral elements in the fruits of the red oak introduced in the M.M. Gryshko National Botanical Garden (NBG) of the National Academy of Sciences of Ukraine. The object of the study was the fruits of *Quercus rubra* collected in September 2022 in NBG.

The study of the qualitative composition and quantitative content of mineral elements was carried out by the X-ray fluorescence method on the energy dispersive spectrometer "ElvaX-med" (Elvatech Ltd., Ukraine) in the Scientific and Technical centre "Viria Ltd." (Kyiv, Ukraine).

The used method made it possible to determine the content of 10 mineral elements: 3 macro- (S, K, Ca), 6 – micro- (Mn, Fe, Cu, Zn, Rb, Sr), and 1 – ultra-microelements (Ni).

It was identified that *Quercus rubra* fruits are characterized by a fairly high content of potassium (3278.74 µg/g) and iron (21.74 µg/g), which play a significant physiological role in the human body. In particular, ferrum is the main component of hemoglobin, which carries oxygen in the blood and is important for metabolism and immune function; potassium – maintains a normal level of liquid in the cells, regulates blood pressure, and promotes the work of the heart and muscles.

The investigation results correlate with our previous studies of red oak fruits collected in Kyiv and Rivne Oblasts. In general, comparing the data on the mineral composition of the fruits of *Quercus rubra* from different places of growth with the results of the current research, it can be concluded that the mineral composition is quite similar, although certain differences are noted depending on the place of growth, in particular, for example, the presence of bromine, cobalt, and zirconium in the fruits of the red oak growing in Rivne Oblast.

The obtained results indicate the perspective of further pharmacognostic investigation on *Quercus rubra* fruits as a potential source of BAS.

Keywords: *Quercus rubra*, macroelements, microelements, ultramicroelements, potassium, ferrum, X-ray fluorescence method.