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Application of biostimulants in the cultivation of *Helianthus tuberosus* L. on the content and uptake of iron and zinc

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Abstract

Jerusalem artichoke (*Helianthus tuberosus* L.) is known not only for its inulin-rich tubers, but also as a potential source of micronutrients such as Fe and Zn, which play an important role in both agriculture and healthcare. Nutritional value is influenced by a variety of factors, including varieties, growing conditions, climatic conditions and the biostimulants used. An analysis of these factors is necessary to manage the cultivation of Jerusalem artichokes effectively. The aim of the study was to determine the effects of the application of biostimulants (Kaishi, Maral, Nutrigreen AD and Vanadoo) on the content and uptake of micronutrients (Fe and Zn) in the tubers of two Jerusalem artichoke varieties grown from 2021 to 2023 in Międzyrzec Podlaski. The content of selected elements was analyzed using inductively coupled plasma-optical emission spectrometry (ICP-OES). The application of the biostimulants Maral, Nutrigreen AD and Vanadoo increased the Fe content by about 10% compared to the control variant. Maral showed the greatest effect on increasing the Zn content (by 10%). The application of the individual biostimulants increased the Fe and Zn uptake. Vanadoo proved to be the best biostimulant for Zn uptake in the tested tubers. Kaishi proved to be the least effective in increasing micronutrient uptake in the JA tubers. Analysis of the two varieties Albik and Rubik showed that the Rubik variety had a higher Fe content, while the Zn content was at a similar level in both varieties. Over the three years of the trial, a decrease in the Fe content and uptake was observed, which was not the case for Zn. The decline in the Fe content in 2023 could be related to deteriorating climatic conditions, which may have affected the availability of this micronutrient to plants. The results of the study suggest that the use of biostimulants in the cultivation of Jerusalem artichokes can help to increase the micronutrient content of the tubers.

Keywords: Jerusalem artichoke, iron, zinc, biostimulants, weather conditions

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