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QUALITY TRAITS OF CORN GRAIN AND BY-PRODUCTS IN RESPONSE TO MACRONUTRIENT FERTILISER AND PLANT GROWTH REGULATOR APPLICATION

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Abstract

This article presents the results of a study investigating the effects of mineral fertilisers and plant growth regulators on the quality parameters of corn grain and its by-products. The research was conducted from 2022 to 2024 at the private agricultural enterprise "Svitanok" in the Kyiv Region, Ukraine. The application of mineral and micronutrient fertilisers altered the chemical composition of the grain: starch and fat contents decreased by 0.19-1.28% and 0.08–0.46%, respectively, while protein content increased by 0.19–0.59% compared to the unfertilised control. Corn biomass excluding grain was characterised by a high carbon content (45.55%) and oxygen content (42.22%), with low levels of sulphur (0.07%) and nitrogen (0.49%). Husk and cob tissues had higher concentrations of carbon (45.90-46.34%), hydrogen (6.35-6.62%), nitrogen (0.55-0.72%), sulfur (0.08-0.10%), and oxygen (43.24-43.36%) than stems and leaves (44.75-45.23%, 5.70-5.96%, 0.25-0.39%, 0.05-0.06%, and 41.12-41.20%, respectively). The application of mineral fertilisers led to a slight increase in ash content (by 0.22-0.32%), hydrogen (0.12-0.27%), nitrogen (0.09-0.16%), and sulphur (0.01%), while reducing carbon (by 0.19-0.46%) and oxygen (by 0.04-0.06%) concentrations. These findings provide insights into the compositional changes in corn grain and residues under different fertilisation strategies, with implications for grain quality improvement and sustainable residue utilisation.

Key words*: corn, mineral fertilizers, plant growth regulators, grain, by-products.*