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MAGNESIUM NITRATE AND TRINEXAPAC-ETHYL IN THE DEVELOPMENT OF WINTER WHEAT YIELD

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The yield of winter wheat is largely determined by the efficiency of the photosynthetic apparatus and the availability of mineral nutrients to the plants. Pigment content and the nitrogen balance index (NBI)/nitrogen flavonol index (NFI) are important indicators of a plant's physiological status, characterising the intensity of photosynthetic processes, nitrogen status, and the level of adaptation to stress factors. This study investigated the impact of foliar application of magnesium nitrate with trinexapac-ethyl on the levels of photosynthetic and protective pigments, the NBI/NFI, and winter wheat (*Triticum aestivum* L.) yield of the Kyivska 19 variety. Field experiments were conducted from 2023 to 2025. The plants were treated once at the BBCH 37–39 stage with either magnesium nitrate (5.0 kg/ha) or trinexapac-ethyl (0.6 L/ha), separately or in combination. SPAD values, as well as chlorophyll content index (CCI), flavonols and anthocyanins content, and the NBI/NFI, were determined in the flag and subflag leaves using SPAD-502 (Konica Minolta) and MPM-100 (Opti-Sciences).

The highest SPAD values in the subflag leaf were obtained through the combined application of magnesium nitrate and trinexapac-ethyl. This indicates that the photosynthetic apparatus remained functional during the grain-filling period. Foliar application of magnesium nitrate reduced flavonoid content; however, its combination with trinexapac-ethyl resulted in an even more pronounced decrease, accompanied by an increase in the NBI/NFI. These results suggest improved nitrogen status in the plants, more efficient utilisation of magnesium in photosynthetic processes and reduced need for defensive phenolic compound accumulation, provided the plants' physiological condition is optimised. Winter wheat yield was highest when

magnesium nitrate was applied either alone or in combination with trinexapac-ethyl. This increase in yield was accompanied by maintained high chlorophyll content, improved nitrogen status indicators, and the photosynthetic apparatus functioning for longer during the grain-filling stage.

Thus, applying magnesium nitrate with trinexapac-ethyl increases the content of photosynthetic pigments and improves the nitrogen balance index/nitrogen flavonol index, ensuring higher yields and confirming the potential of this approach in modern grain crop cultivation technologies.

Keywords: *Triticum aestivum*, nutrition, PGR, pigments, crop yield.

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