

Verification of the effectiveness of AZOTER[®] soil microbial fertilizer and AZOTER[®] L leaf bacteria fertilizer in the cultivation of common sunflower carried out by the Institute of Agronomic Sciences at Faculty of Agrobiolgy and Food Resources of SUA in Nitra in 2023

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Characteristics of the site and experimental site

The field experiment with common sunflower (*Helianthus annuus* L.) was carried out in 2023 at the research-experimental site of the Center for Plant Biology and Ecology of the Faculty of Agrobiolgy and Food Resources of the Slovak University of Agriculture in Nitra. The experimental area is geographically located in the western part of Žitava Hills at the altitude of 170-175 m. The location of the research site has the character of a plain with medium-heavy loam soils and Haplic Luvisol Aric (HMa) soil type. The experimental site with its available nutrient content according to the agrochemical analysis showed a high supply of available nutrients. The humus content was 2.69% and pH was 7.40. The location of research-experimental site is at the sunflower production area which is in a very warm agro-climatic region, with an average amount of precipitation to 320.3 mm during the months from IV. to IX. The experiment was carried out simultaneously focusing on corn and common sunflower.

The aim of the experiment

The aim of the experiment was to compare the effectiveness of AZOTER[®] soil bacteria fertilizer (nonsymbiotic bacteria and according to product of AZOTER[®] F/SC on the basis of its focus in combination with the mycoparasitic fungus *Trichoderma atroviride* and *Conithyrium* sp.) applied to the soil during pre-sowing soil preparation as well as the combination of AZOTER[®] soil fertilizer application and AZOTER[®] L leaf bacteria fertilizer at different application rates of nitrogen (reduction by 30 or 50%) on the grain yield parameters of common sunflower, in comparison with the control variants, especially with the variant fertilized with full NPK nutrition. For the purposes of the experiment, the dose of fertilization for full rebalancing of nutrients was determined on the agrochemical analysis. This experiment was aimed to verify the effectiveness of AZOTER[®] and AZOTER[®] L bacteria component in nitrogen reduction. Other fertilization parameters (P, K) were kept in all fertilization variants at the same level.

Variants in the experiment

The experiment was carried out in several variants. In the control variant, the experiment was carried out on the unfertilized soil and on the soil fertilized with a full dose of NPK. Also, the experiment was carried with AZOTER[®] and AZOTER[®] L application at different doses of nitrogen fertilization. The experiment was established in a conventional method of cultivation, and it repeated for three times.

In the variant with the full dose of NPK, the dose of nitrogen was determined on the basis of the previous agrochemical analysis in the range of 267.7 kg N. ha⁻¹. In the variant with a reduced nitrogen dose by 30% compared to the monitored full N dose (N dose reduced by 80.8 kg.ha⁻¹), AZOTER[®] fertilizer was applied in the standard recommended dose (10 l.ha⁻¹; 150-200 l H₂O, application performed before sowing with immediate incorporation into the soil). In the variant with a nitrogen dose reduced by 50% compared to the observed full dose of N (reduction of pure N application by 133.85 kg.ha⁻¹), AZOTER[®] F application was used in the standard recommended dose (10 l.ha⁻¹; 150 - 200 l H₂O, applied before sowing with immediate incorporation into the soil) and the subsequent application of AZOTER[®] L fertilizer (10 l.ha⁻¹; 150-200 l H₂O, at the growth stage of 6-8 true leaves of the experimental crop).

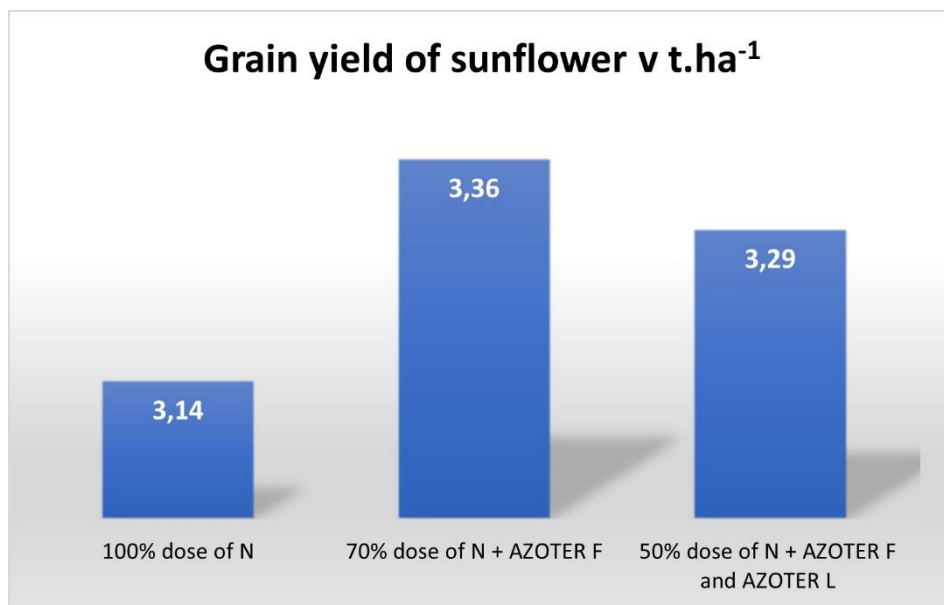


Chart: The effect of AZOTER and AZOTER L bacteria fertilizer when the nitrogen was reduced, compared to the full dose of NPK on the yield of common sunflower.

Conclusion

In the experiment, the effect of AZOTER[®] and AZOTER[®] L preparations with different doses of nitrogen fertilization on the yield of sown corn was monitored. The other fertilization parameters (P. K) did not change in the individual fertilized variants.

The results of the experiment confirmed the overall positive effect of AZOTER[®] bacteria fertilizer (in pre-sowing application) and the combination of AZOTER[®] soil bacteria fertilizer (in pre-sowing application) with AZOTER[®] L foliar-applied microbial preparation (in application at the growth stage of 6-8 true leaves) on the formation of the common sunflower crop.

The results verified the positive effect of AZOTER[®] preparation on the soil adequately supplied with nutrients, both in the variant combined with a full dose of NPK fertilization, as well as in the reduction of fertilization by 30% and by 50% in combination with AZOTER[®] L foliar nutrition. Relatively lower benefit of AZOTER[®] F application at the full dose of NPK results from the limiting ability of plants to receive nutrients.

In the variant where there was a 30% reduction in the nitrogen dose and the application of AZOTER[®] fertilizer at the standard dose, the sunflower grain yield of 3.36 t.ha⁻¹ was achieved. It represented an increase by 7% or by almost 0.22 t.ha⁻¹ compared to the variant with the application of a full dose of NPK fertilization (grain yield of 3.14 t.ha⁻¹), at the current savings of the nitrogen dose by 80.8 kg.ha⁻¹.

In the variant with a 50% reduction of the total dose of N and the combination of AZOTER[®] application at the standard dose and AZOTER[®] L foliar application, we recorded an increase in the yield compared to the variant with full NPK nutrition. The increase in the grain yield in relative percentages represented a value of 4.77%, or by 0.15 t.ha⁻¹, at the current savings of the nitrogen dose by 133.85 kg.ha⁻¹).

The experiment was carried out in cooperation with: AZOTER Trading s.r.o. Dúbravská 2, 841 04 Bratislava, Slovakia

