

Table-beet summary PDF

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Editorial note

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Scientific Report: Evaluation of the Effectiveness of the ChitoHumus Biostimulant on Table Beet Yield (Variety 'Kestrel')

Location: AREI Stende Research Center, Latvia Research Object: Table beet (*Beta vulgaris*), variety 'Kestrel' Main Focus: Comparison of soil biological activation without mineral fertilizers versus traditional NPK fertilization background.

1. Emergent Effect: ChitoHumus (C2) vs NPK

During the study, a unique emergent result was observed: the treatment variant without mineral fertilizers but with an increased biostimulant dose (NPK 0 C2) exceeded the control variant with full mineral fertilization (NPK Control) in terms of yield.

This demonstrates that ChitoHumus is capable not only of supplementing fertilizers, but also of acting as a powerful mobilizer of natural soil fertility, activating plant potential at a higher level than standard chemical fertilization.

Comparative Yield Indicators (t/ha)

● NPK 0 C2 (Biostimulant 0.2 L/ha without mineral fertilizers): 57.67 t/ha ● NPK Control (Full mineral fertilization without biostimulant): 55.33 t/ha

Difference (Increase)

The use of the ChitoHumus biostimulant alone at the C2 rate produced a yield that was 2.34 t/ha higher than the yield achieved using the standard mineral fertilizer complex (NPK).

In percentage terms, this represents a +4.2% bioactivation advantage over mineralization.

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2. Analysis of the NPK C1 Variant (Biostimulant + Fertilizer)

The application of the biostimulant in combination with mineral fertilization also demonstrated significant improvements in performance indicators. The NPK C1 variant showed the most stable yield increase among all fertilized variants.

Comparative Yield Indicators (t/ha)

● NPK C1 (NPK + 0.1 L/ha ChitoHumus): 62.84 t/ha ● NPK Control (NPK without biostimulant): 55.33 t/ha

Difference (Increase)

Adding the C1 dose on top of the NPK background increased yield by 7.51 t/ha, or +13.6%.

This confirms the role of ChitoHumus as an effective synergist that improves the uptake efficiency of mineral nutrients from fertilizers.

3. Sugar Content (Brix %)

Analysis of quality indicators (Brix %) confirms that increased yield does not reduce product quality — on the contrary, it improves it.

● NPK 0 C2: 10.7% Brix

Compared to the control without NPK (10.2%), the C2 dose of ChitoHumus ensured sugar accumulation even in the absence of mineral fertilizers. ● NPK C1: 12.0% Brix

Compared to the NPK control (11.6%), a quality increase of +3.4% over control was observed.

This confirms the ability of ChitoHumus to intensify carbohydrate metabolism.

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4. Additional Quality and Morphological Indicators

The effectiveness of the NPK 0 C2 variant is confirmed not only by total yield weight, but also by the qualitative characteristics of the root crops.

● Average root weight (NPK 0 C2): 0.251 kg

(compared to 0.209 kg in the NPK control) ● Leaf mass (NPK 0 C2): 0.166 kg

(compared to 0.088 kg in the NPK control)

This indicates the formation of a strong photosynthetic apparatus without additional nitrogen stimulation.

Conclusions

The study results allow the following conclusions to be drawn:

1. Replacement of Mineral Fertilization

A ChitoHumus dose of 0.2 L/ha (C2) in soil without mineral fertilizers achieved a yield of 57.67 t/ha, exceeding the control with full NPK application by 2.34 t/ha. This proves the emergent capability of the product to replace significant portions of mineral fertilizers by activating soil resources.

2. Maximum Productivity Potential

The NPK C1 variant (62.84 t/ha) was the most productive in absolute terms, providing an increase of 7.51 t/ha under mineral fertilization conditions and achieving the highest sugar content (12.0% Brix).

3. Recommendation

In soils with sufficient nutrient reserves, ChitoHumus can be used as a primary yield-enhancing agent, allowing substantial reduction or even complete elimination of mineral fertilizer expenses while maintaining — and even increasing — productivity and quality.