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Bioboost-Pro

Exploring biobased nutrient solutions for hydroponic lettuce cultivation 12/11/2026

Bioboost-PRO supports the hydroponics sector in transitioning from a linear to a circular value chain by developing and testing circular fertilizers derived from manure.

Research objective

As part of this project, Botany investigates the performance of these circular fertilizers in hydroponic baby-leaf lettuce cultivation, focusing on crop growth, biomass production and nutrient availability compared to conventional mineral fertilizers.

Experimental setup

The greenhouse trial was conducted at Botany from week 29 to week 33, using Cristabel baby-leaf lettuce grown in a hydroponic system.
Three nutrient strategies were compared:

1. Conventional: Standard mineral fertilizer solution.
2. Biobased: HNCN (Company: Van der Knaap) and Greenswitch Original (Company: Van Iperen) commercial fertilizers
3. Biobased + Twence ABC: Biobased (68% biobased) Twence ABC (69% biobased)

Each treatment covered an area of 8 m², with a cultivation period of 27 days. Crop growth, fresh and dry biomass, nutrient solution composition, pH and plant nutrient concentrations were monitored throughout the trial.

Key research findings

1. Promising biomass production with biobased fertilizers
Both biobased treatments achieved higher normalized fresh biomass yields than the conventional treatment.

- Conventional: 3.67 kg/m²
- Biobased: 3.87 kg/m² (+5.5%)
- Biobased + Twence ABC: 3.97 kg/m² (+8.3%)

These figures represent normalized sample-based yield estimates rather than measured total harvests.

2. Differences in dry matter production
The biobased treatment achieved 9.8% higher dry biomass per plant compared with conventional fertilization.
The addition of Twence ABC resulted in higher fresh biomass, but only a 1.1% increase in dry biomass, suggesting that the additional fresh weight was primarily associated with water content.

3. Nutrient balance requires further optimization
The Twence ABC treatment showed a temporary decline in nutrient solution pH, reaching a minimum of 4.61.
Potassium concentrations also decreased more strongly in the biobased treatments, highlighting the importance of targeted nutrient replenishment and stable nutrient management.

4. Comparable crop development
At harvest, plant height and leaf number were similar across all three treatments, indicating comparable morphological development under the tested conditions.



Conclusions and future research

The results demonstrate the potential of biobased nutrient strategies for hydroponic lettuce cultivation.
The biobased treatment showed promising fresh and dry biomass production, while the addition of Twence ABC highlighted opportunities for nutrient recovery alongside challenges in pH stability and nutrient balance.
Further research will focus on increasing the percentage of biobased nutrients with commercially available products suitable for practical use in horticulture.

Contact

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This trial was conducted by:

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