



Latvia University
of Life Sciences
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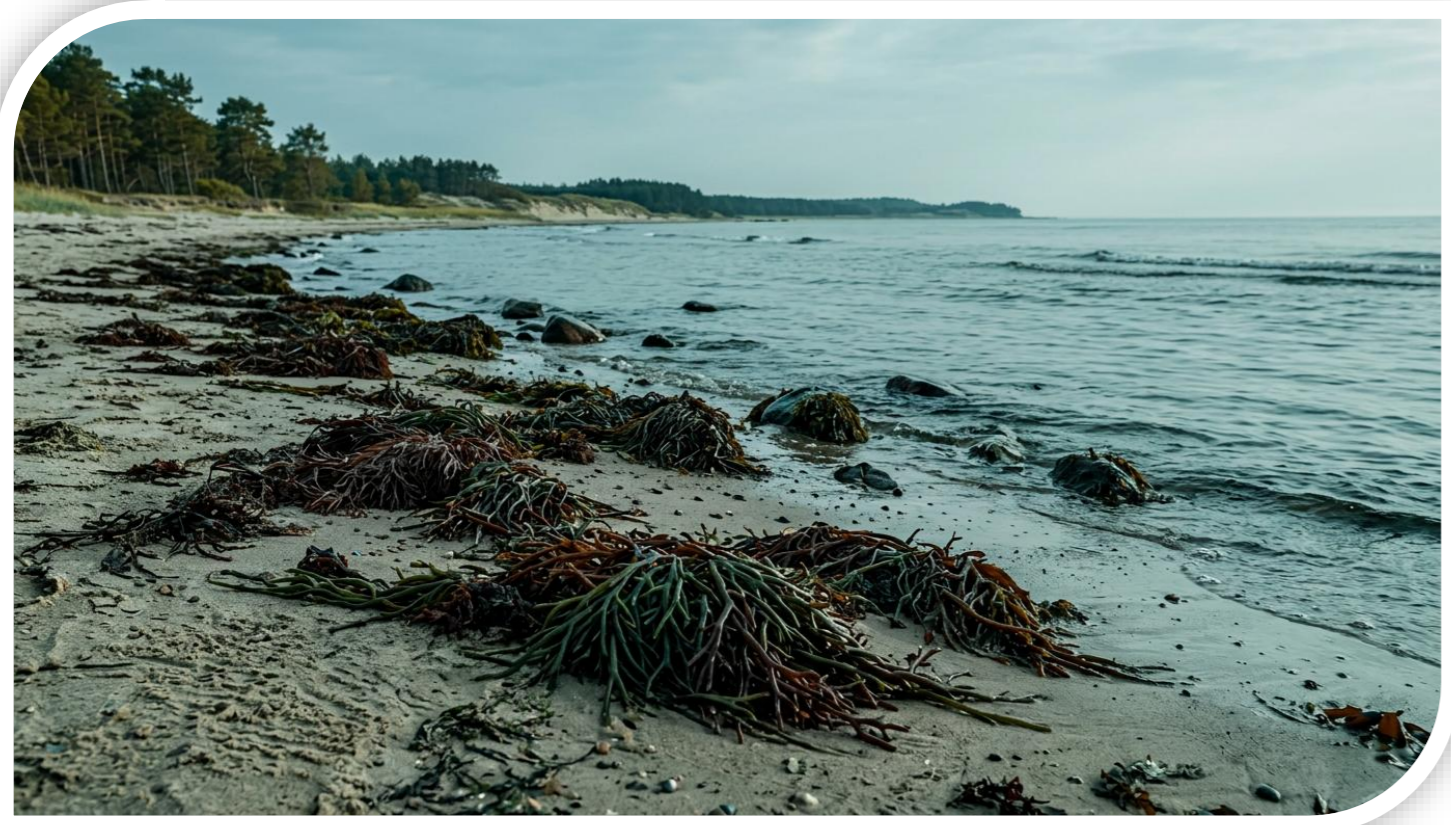
Baltic Sea Algae as a Biostimulant Raw Material: A Multifunctional Utilization Concept



Inese Skapste

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INTRODUCTION



Baltic Sea macroalgae *Furcellaria lumbricalis* was evaluated as a biostimulant raw material. NPK fertilizer costs €350–495/bag (2022–2024), creating import dependency. *Furcellaria lumbricalis* shows high bioactive potential as a sustainable alternative. 120 kg of algae was collected from Ventspils, Liepāja, Jūrmala, Pāvilosta, and Roja, processed over 3 weeks via anaerobic digestion yielding biogas (45 L), digestate (38 kg), liquid digestate, and solid compost.

OBJECTIVES



1. Evaluate *Furcellaria lumbricalis* as biostimulant feedstock
2. Assess anaerobic digestion efficiency for circular bioeconomy
3. Test digestate biostimulant effect on 4 crop species
4. Quantify economic benefits vs. conventional NPK fertilizers

ACKNOWLEDGEMENT

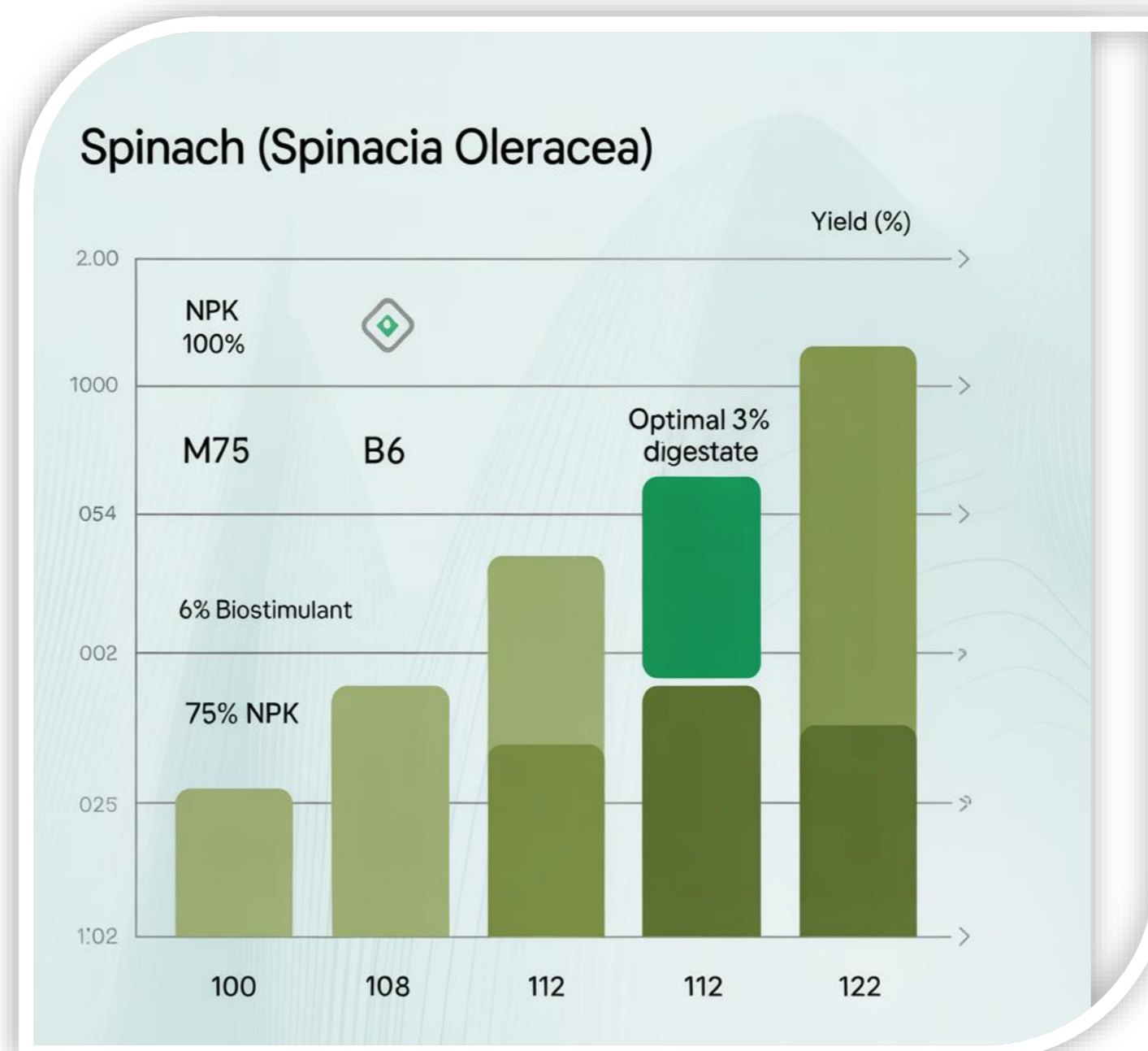
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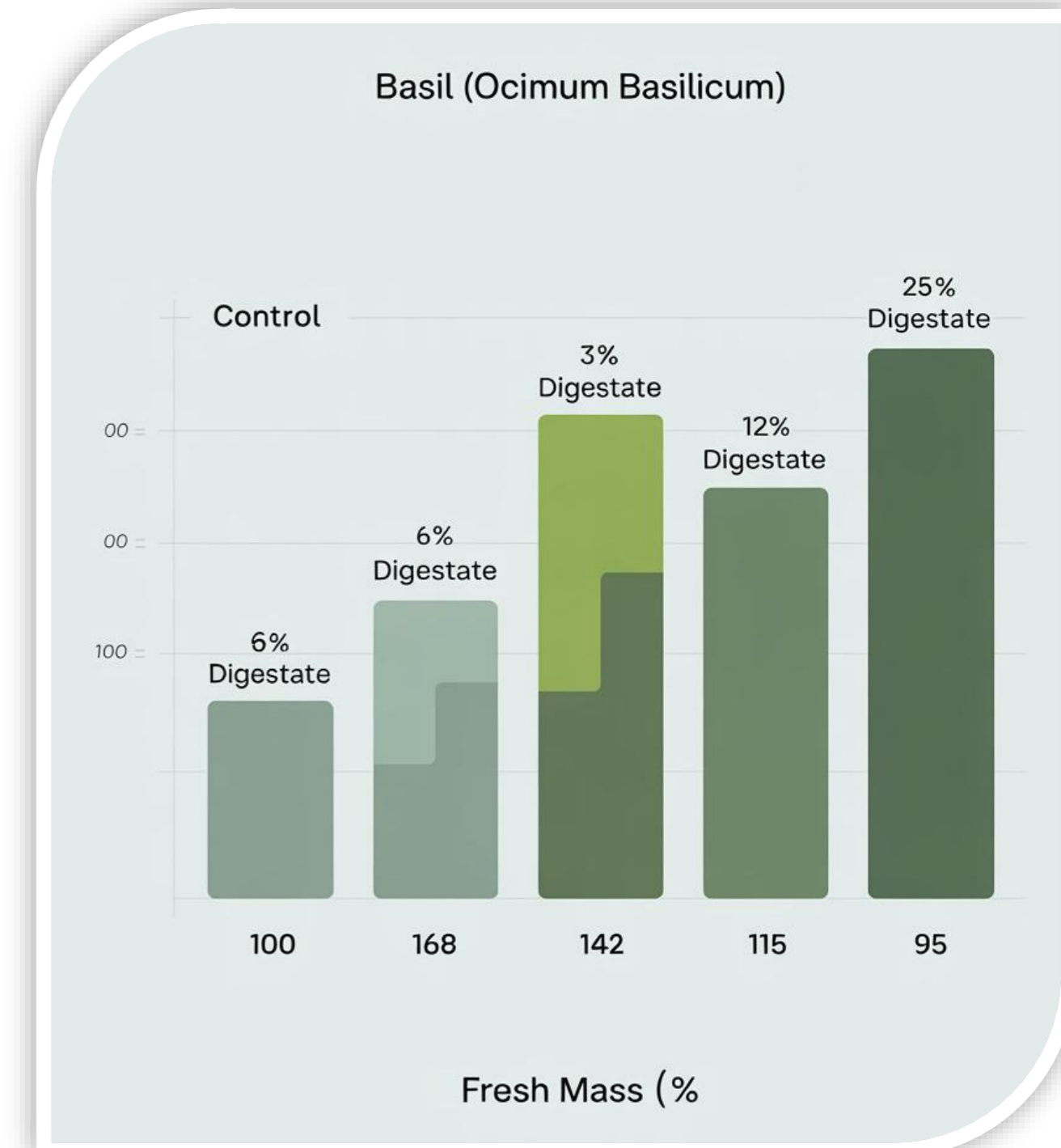


RESULT

Spinach (*Spinacia oleracea*)

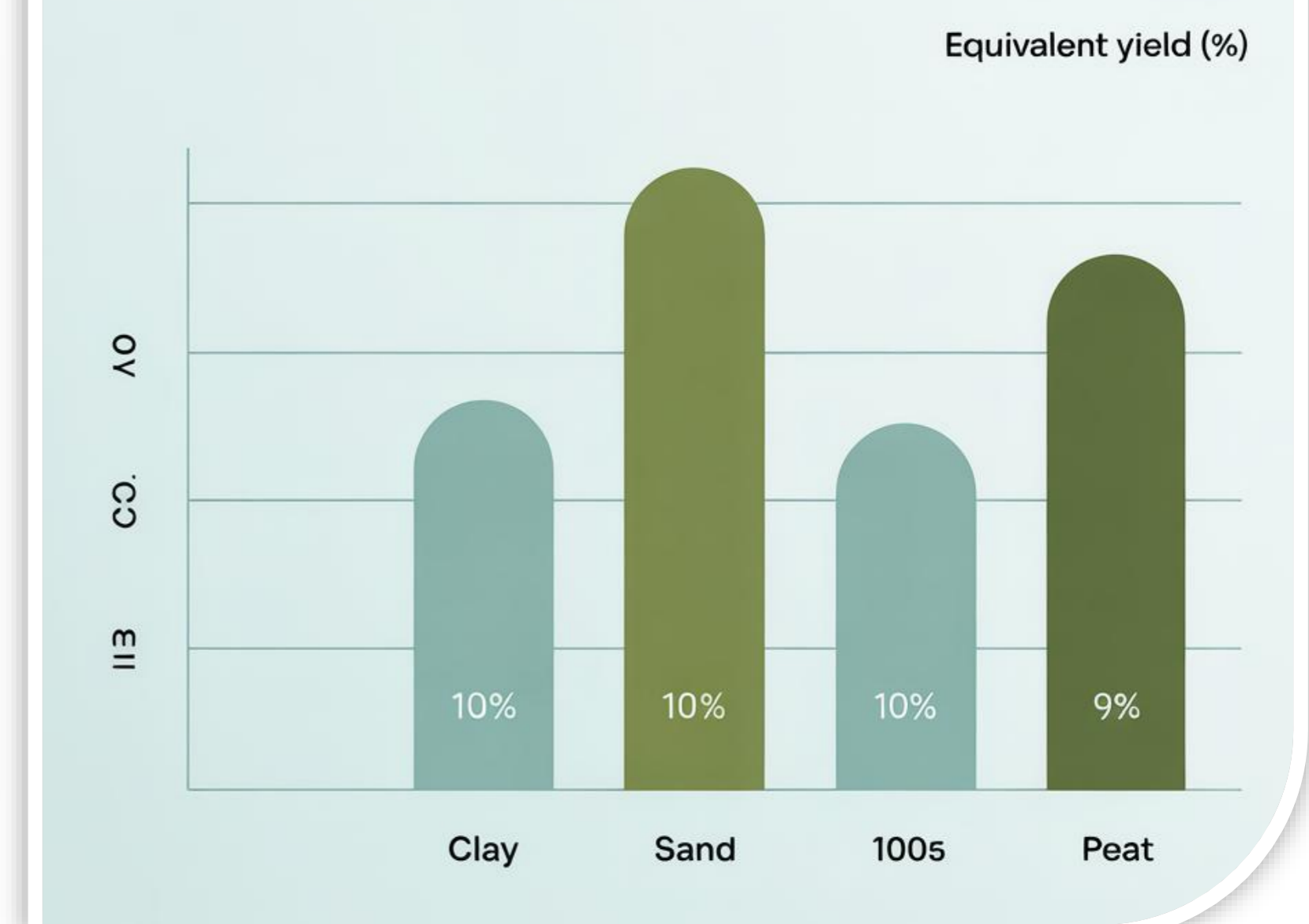


Basil (*Ocimum basilicum*)

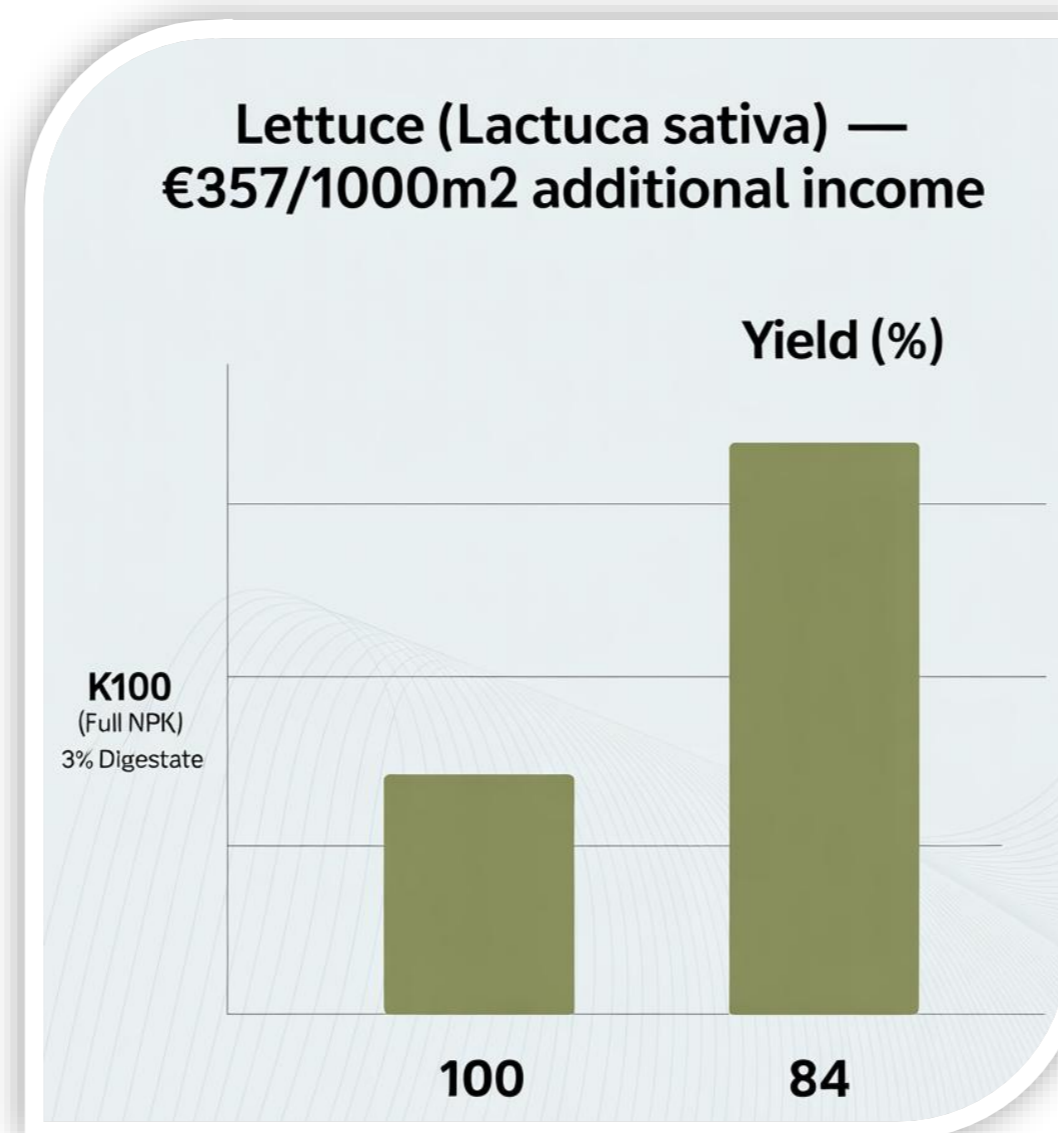


Radish (*Raphanus sativus*)

Radish (*Raphanus sativus*) — equivalent yield across substrates



Lettuce (*Lactuca sativa*)



CONCLUSIONS



1. Optimal biostimulant concentration: 3% digestate across all tested crops
2. +68% basil fresh mass increase
3. +22% above full NPK → spinach
4. 84% of full NPK yield → lettuce
5. +45% gross profit increase (lettuce), €357/1000 m² additional income
6. Circular Bioeconomy 3-in-1: Biostimulant + Biogas + Compost from one process