DeliSoil

Delivering soil improvers from circular food production processes to boost soil health

Practice Abstract 14

Insect production and insect frass

Summary

Insect production is an emerging technology that converts low-value feedstocks, such as food processing residues, into high-protein feed for animals and material (chitin) for the medical and chemical industry. A common by-product of this process is insect frass, consisting of insect excrement, chitin fragments (molting), dead insects and feed residues, which is rich in carbon and nutrients. Due to these components, frass has potential as a bio-based fertilizer and soil improver, contributing to circular bioeconomy approaches as well as alternative protein production.

The product development and soil application of insect frass-based soil improvers is tested within the DeliSoil Living Labs in Denmark and Germany. Before application to soil, frass typically requires heat treatment and microbiological testing to meet regulatory safety standards. The composition of frass largely depends on the feedstock provided to the insects, which often includes protein- and carbohydrate-rich residue, supporting optimal larval growth. The insect species and the rearing conditions also influence the frass characteristics.

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Practical Recommendations

We aim to assess the effects of insect frass on soil health and its fertilizing value. This is being tested through controlled pot and incubation experiments, as well as experimental field trials. Understanding frass properties and its impact on nutrient release, soil fertility, and soil health can help optimize its use in sustainable agriculture, supporting the valorization of food residues while reducing waste.

Needs addressed by the practice

This practice abstract addresses the possibility to close nutrient loops, minimize food-processing waste, and enhance soil health and fertility in European intensive agricultural systems.

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About DeliSoil

The EU-funded DeliSoil project is a four-year initiative that aims to transform food industry byproducts into safe, sustainable, and tailored soil improvers. This project addresses two pressing challenges: the poor recycling of industrial food processing byproducts and the degradation of soil health.

By harnessing a circular approach, DeliSoil will contribute to improving soil health and productivity, supporting the EU Mission "A Soil Deal for Europe" and the Farm to Fork Strategy, as well as other Circular and Bioeconomy Strategies and Plans.

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