

Characterization of Soil Health Indicators and Soil Microbiome Analysis When Treated with Combined Use of Food Processing Residues and Microbial Biofertilizers

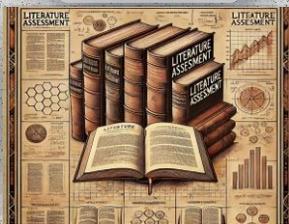
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The PhD thesis project can be subdivided into the following activities:

A1



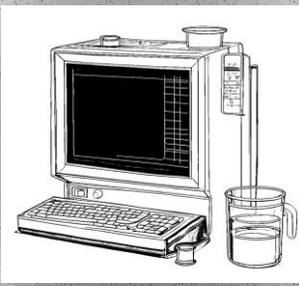
Literature Assessment

Formulation of research question: Clear objectives and protocols are developed.

Comprehensive search: Rigorous search strategies encompassing various sources are employed.

Screening process: Studies undergo independent assessment based on predefined criteria.

Data extraction: Relevant information is systematically extracted from included studies.



A2

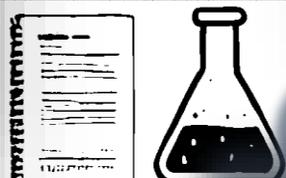


Pot-Experiments



Establish an **efficient operational protocol**, specifying the optimal application method. **Track soil and plant indicators** to assess how improvers **impact** soil health and crop growth.

Determine the most efficient custom soil enhancer formulations for implementation in field trials at plot scale.



A3



Plot-scale field trials

Assess the effects of custom soil enhancers on soil health using indicators.

Investigate how tailored soil enhancers affect the soil microbiome.

Perform risk assessment of microbiomes through shotgun metagenomic sequencing analysis.



A4

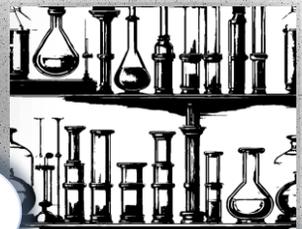


Tailored soil improvers with microbial-based products

Testing Synthetic Microbial Consortia (SMC) and commercially available products in conjunction with selected tailored soil amendments, including insect by-products.

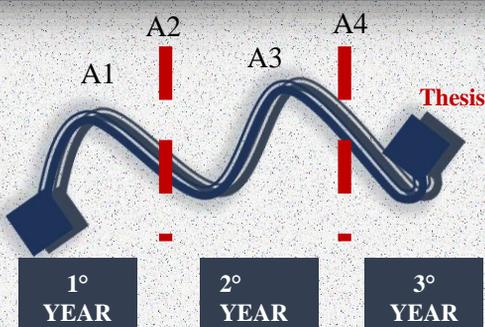
Assessing the effects of these combined formulations on soil health.

Analysing the performance of mixed formulations on soil microbiota.



Project insights

- ◆ The utilization of **biofertilizers** and microbial inoculants offers sustainable alternatives to conventional chemical fertilizers.
- ◆ **Microbial inoculants** involve the deliberate introduction of beneficial microorganisms into the soil to promote plant growth and suppress pathogens.
- ◆ Identification of **novel biomarkers** of **soil health** will be undertaken.
- ◆ Analysis of **16S rRNA** gene sequencing data will be utilized to interpret bioindicators that correlate with biological, physical, and chemical soil properties essential for assessing soil health.
- ◆ **Whole genome sequencing (WGS)** methods will be employed to evaluate the functional potential of microbial communities.
- ◆ A key feature of this study is its specificity, focusing on **territory-specific** field studies and utilizing **food waste** from local productions.



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