PRACTICE ABSTRACT

TRIBIOME

Microbial modulation for climate-resilient agriculture

SUMMARY

This abstract explores the microbial modulation for climate-resilient agriculture and for healthy and plant-based food chain in constantly growing world population, focusing on soil microbiome interactions and plant health. Utilizing microorganisms and natural stimulants from agricultural waste, the aim is to enhance soil microbiome resilience to environmental stresses. Through circular economy principles, this initiative promotes sustainable food systems and nutrient biofortification.

EXPECTED RESULTS

Microbial diversity: a diverse array of microbial species identified and characterized, emphasizing their potential to enhance plant productivity and climate resilience.

Bioaugmentation validation: successful validation of bioaugmentation technologies showcasing their effectiveness in fortifying crops against climate-induced stresses and both biotic and abiotic stress conditions.

Nutrient biofortification: implementation of microbial modulation leading to enhanced biofortification of essential micronutrients critical for human and animal health.

PROBLEM

Current agriculture faces multifaceted challenges, exacerbated by climate change and increasing demands for food production. Insufficient understanding of soil-plant microbiome interactions slows down efforts to enhance crop resilience and nutritional content, leading to decreased productivity and environmental degradation.

SOLUTION

Modulators of the soil microbiome enhance the resilience of wheat, reducing the environmental impact and promoting healthy food chain under the paradigm of climate change, by using of agri-food residues from the harvesting and processing of wheat crops.

PRACTICAL RECOMMENDATIONS

Implement biofortification strategies using modulators derived from agricultural biowaste.
Foster circular economy principles by valorising agricultural residues for the production of microbiome modulators.
Diversify cropping systems and integrate cover crops to promote soil microbiome diversity.
Minimize the use of synthetic fertilizers and pesticides, opting for organic and sustainable alternatives.
Educate farmers and agricultural practitioners on the benefits of microbiome modulation and sustainable agricultural practices.

APPLICABILITY BOX

Theme: microbial modulation, sustainable agriculture
Keywords: microbiomes, climate resilience, sustainable farming, circular agriculture, crop fortification, healthy food
Geographical coverage: EU and South Africa
Application time: year-round
Period of impact: immediate and long-term
Equipment: microbial charac-terization tools, bioaugmentation technologies, biofertilizers

BENEFITS

Climate-resilient crops: microbial modulation increases crop resilience and productivity, reducing reliance on external inputs.
Micronutrient-rich produce: biofortification of crops with essential micronutrients improves the nutritional quality of produce, supporting human and animal health.
Mitigation of environmental impacts, including soil erosion and greenhouse gas emissions.
Long-term sustainability and resilience of agricultural systems, ensuring food security for future generations
Enhanced soil health and structure, promoting biodiversity and ecosystem stability.

TARGETS

Farmers and agricultural practitioners seeking to enhance crop productivity and sustainability.
Agricultural extension services and research institutions involved in promoting sustainable farming practices.
Government agencies and environmental organizations advocating for soil and ecosystem health.

CONCLUSION

Microbial modulation for climate-resilient agriculture underscores the transformative potential building climate-resilient agricultural systems. The envisioned future sees microbial technologies not only as tools for agricultural advancement but as essential components in the pursuit of sustainable and climate-resilient food production. This approach marks a significant stride towards ensuring the coexistence of agriculture with the dynamic challenges posed by climate change, reinforcing the connection between human well-being, resilient ecosystems, and the agriculture of tomorrow.

FURTHER INFORMATION/ BIBLIOGRAPHY

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ABOUT THIS PRACTICE ABSTRACT

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TRIBIOME: The project is running from January 2023 to DECEMBER 2026. The overall goal of TRIBIOME- Advanced tools for the integration and Synergistic interconnection of Microbiomes in resilient food system. Objectives are increasing adoption of microbiome based innovations into crop production and agricultural management practices, reducing nutrient losses and reducing the use of harmful fertilisers through the combination of nutrients with modulators.
Project website: www.tribiome.eu

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