Rhizobacterial Isolate Biofertilizer-Biostimulant

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Food & AgricultureBiological Fertilizer

Abstract

Poor soil quality and low-water conditions significantly impact crop performance. This problem is exacerbated by the increased human activity and frequency of extreme weather events, both of which damage soil health and lead to reduced crop yield. Researchers in the Quinney College of Agriculture and Natural Resources at Utah State University have isolated a specialized, plant growth-promoting bacterium that can alleviate drought stress in plants, improve soil quality, and increase the market-quality yield of various crops.

What It Is

A bio-stimulant that increases crop yield for plants in poor soil quality and low-water conditions.

Value Proposition

Chemical fertilizers can lead to soil degradation, high costs, and water pollution. This innovation promotes soil and plant health while decreasing the reliance on chemical fertilizers.

Applicable Markets

Commercial agriculture, fruit and vegetable production, fertilizer, bio-stimulant, dry climate farming.

Benefit

Currently in agriculture, crop yields face problems such as droughts, soil salinity, invasive weeds, and pests. Additionally, climate change and increases in pollution, urbanization, and infrastructure expansion lead to increased soil damage and drought risk, exacerbating the problems that negatively affect crop yields. As these problems accelerate, farmers are forced to rely on chemical fertilizers to combat their decreasing crop yields. However, this reliance on chemical fertilizers increases the cost of food production while leading to additional soil degradation and water pollution.

Researchers at USU have discovered that the application of a specialized, isolated bacterium mitigates drought stress, blossom-end-rot, and insect attacks on crop yield. Additionally, the use of the bacterium as a bio-stimulant increases drought tolerance in plants, improves crop uptake in nitrogen, and solubilizes phosphorus; these benefits promote plant growth and soil quality, reducing the reliance on chemical fertilizers. This bacterium, used as a bio-stimulant, is a novel and sustainable additive for crop fertilization, especially in dry-climate regions.

Market Application

This technology has applications in commercial agriculture, fruit and vegetable production, fertilizer, bio-stimulant, and dry climate farming markets. Specifically, this discovered bacterium serves as a microbial-based bio-stimulant. Microbial-based bio-stimulants account for 20% of the $3.29 billion global bio-stimulant industry, representing approximately $658 million of the market value.

Researchers

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Funding

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USU Reference No. C26023

Publications

- Ganesh J, Singh V, Hewitt K and Kaundal A (2022) Exploration of the rhizosphere microbiome of native plant Ceanothus velutinus – an excellent resource of plant growth-promoting bacteria. Front. Plant Sci. 13:979069. https://doi.org/10.3389/fpls.2022.979069

Development Stage

Technology Readiness Level: 3-4