PROBIOTIC-MINERAL BIOFORMULATION EMBEDDED IN SEAWEED-DERIVED POLYMERS FOR ENHANCED INOCULATION OF SEAWEED CULTURE LINES

Tech ID: 34042 / UC Case 2025-138-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

The global demand for seaweed in food, biomaterials, and energy is rapidly increasing, yet commercial cultivation is often limited by high mortality rates due to disease and suboptimal nutrient conditions, presenting a major bottleneck for the industry. This innovation, developed by UC Berkeley researchers, addresses this problem by introducing a novel Probiotic-Mineral Bioformulation Embedded in Seaweed-Derived Polymers designed for enhanced and targeted inoculation of seaweed culture lines. This bioformulation encapsulates beneficial probiotic bacteria and essential micronutrients (minerals) within a protective, naturally sourced, and biodegradable polymer matrix. Unlike traditional methods that rely on simple, often inefficient, direct immersion or broth application of probiotics, this technology ensures sustained release and enhanced adhesion of the beneficial agents directly onto the seaweed seedlings or culture environment. This protective delivery mechanism significantly increases the survival rate and efficacy of the inoculum, leading to healthier, faster-growing, and more resilient seaweed biomass compared to standard cultivation practices.

SUGGESTED USES

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Prophylactic treatment for seaweed seedling nurseries to prevent common bacterial and fungal diseases before outplanting.

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Targeted nutrient delivery system to enhance the growth rate and biochemical composition (e.g., protein, lipid, or specific metabolite content) of high-value seaweed culture lines.

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Bio-augmentation agent for large-scale seaweed ocean farms (aquaculture) or land-based recirculating aquaculture systems (RAS).

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A tool for selective breeding by providing a highly optimized microbiome for newly developed, disease-susceptible, or fast-growing seaweed strains.

ADVANTAGES

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Enhanced Inoculum Viability: The polymer matrix shields probiotics from environmental stressors like UV light, osmotic shock, and contaminants, significantly improving their survival upon application.

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Agriculture & Animal Science**

» Other

» Plant Traits

» **Biotechnology**

» Other

» **Materials & Chemicals**

» Biological

» Polymers

RELATED CASES

2025-138-0

Sustained and Targeted Release: The structure allows for the gradual release of probiotics and minerals, providing a long-lasting protective and nutritional effect, reducing the frequency of application.

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Increased Seaweed Health and Yield: Leads to higher disease resistance, reduced mortality rates, and increased biomass accumulation compared to non-inoculated cultures.

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Environmentally Sustainable: The delivery vehicle is highly suitable for marine and aquatic environments.

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Ease of Application: The bioformulation can be readily applied as a coating, a seed stock dip, or integrated into the culture growth medium.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- SEA-BOARD — A Marine-Derived Structural Panel from Aligned and Densified Seaweed Cellulose Nanofibers
- Integrated Seawater Air Conditioning And Seaweed Cultivation System For Sustainable Energy And Resource Recovery

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