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HARMONIZED BIOTECHNOLOGY FOR PLANT PROTECTION AGAINST PATHOGENS: UTILIZING BIOPREPARATIONS BASED ON BIODEGRADABLE POLYMERS

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ABSTRACT: This thesis aims to explore the potential of harmonized biotechnology in plant protection against pathogens through the utilization of biopreparations based on biodegradable polymers. The study investigates the development, mode of action, efficacy, and environmental impact of these innovative formulations, with a focus on their application in sustainable agriculture practices. By integrating biodegradable polymers with beneficial microorganisms, this research seeks to contribute to the advancement of eco-friendly and effective plant protection strategies.

KEYWORDS: Biotechnology, plant,pathogens, polymers, benefits.

INTRODUCTION

The protection of plants against pathogens is a crucial aspect of agricultural practices worldwide. Pathogens, including bacteria, fungi, viruses, and other microorganisms, can cause significant crop losses, reduce yield quality, and threaten food security. Traditional plant protection methods often rely on the use of chemical pesticides, which can have detrimental effects on human health and the environment. Therefore, there is a growing need for sustainable and eco-friendly alternatives that can effectively combat plant pathogens while minimizing negative impacts.
Biopreparations based on biodegradable polymers offer a harmonious and environmentally friendly approach to plant protection against pathogens. These innovative formulations combine the benefits of biotechnology and biodegradable materials to provide effective and sustainable solutions for crop health management.

Biopreparations: Biopreparations refer to formulations containing beneficial microorganisms or their metabolites that can enhance plant growth and protect against pathogens. These preparations are typically developed using naturally occurring microorganisms, such as bacteria, fungi, or viruses, which have the ability to inhibit or suppress pathogenic organisms.
Biodegradable polymers: Biodegradable polymers are materials that can be broken down by biological processes, such as microbial degradation or enzymatic activity. These polymers are designed to degrade over time, leaving behind harmless byproducts. By incorporating

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biodegradable polymers into biopreparations, it is possible to create eco-friendly formulations that minimize environmental impact.

Plant protection against pathogens: Pathogens pose significant threats to crop health and can cause substantial yield losses. Traditional methods of plant protection often involve the use of chemical pesticides, which can have adverse effects on the environment and human health. Biopreparations offer an alternative by harnessing the natural defense mechanisms of beneficial microorganisms to suppress or outcompete pathogens, thereby reducing the need for chemical interventions.

Harmonious approach: The use of biopreparations based on biodegradable polymers promotes a harmonious approach to plant protection. This approach prioritizes sustainability and the preservation of natural ecosystems by minimizing the use of synthetic chemicals and reducing the accumulation of non-biodegradable waste in the environment. Biopreparations target specific pathogens while leaving non-target organisms unharmed, maintaining ecological balance and biodiversity.

Benefits and applications: Biopreparations based on biodegradable polymers offer several advantages. They can enhance plant growth, improve nutrient uptake, and increase resistance to diseases. These preparations are safe to use, as they are derived from natural sources and do not leave toxic residues. Additionally, they can be integrated into existing agricultural practices, including conventional, organic, and sustainable farming systems.

In summary, the harmonious biotechnology of plant protection against pathogens using biopreparations based on biodegradable polymers represents a promising approach for sustainable agriculture. By harnessing the power of beneficial microorganisms and utilizing environmentally friendly materials, this innovative strategy aims to safeguard crop health while minimizing the ecological footprint of agricultural practices.

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