



STUDIES ON THE MANAGEMENT OF JACKFRUIT ROT DISEASE USING PLANT OIL EXTRACTS

S Shanmugapackiam^{1*} and S Subashini²

¹Pushkaram College of Agriculture Sciences, Pudukkottai – 622 303

²RVS Padmavathy College of Horticulture, Sembatty – 624 707

*Corresponding Author Mail ID: smpatho@gmail.com

Introduction

Jackfruit (*Artocarpus heterophyllus* Lam.) is a tropical fruit renowned for its unique flavor, nutritional value, and versatility in culinary applications. However, it is susceptible to various diseases, one of the most detrimental being rot disease, caused primarily by fungal pathogens such as *Fusarium*, *Rhizopus*, and *Botrytis*. The management of jackfruit rot disease is essential for reducing post-harvest losses and ensuring the availability of this important crop. This article reviews recent studies on the use of plant oil extracts as a biopesticide approach to manage jackfruit rot disease.

The Impact of Jackfruit Rot Disease

Jackfruit rot disease not only affects the quality of the fruit but also poses significant economic challenges to growers. Symptoms include discoloration, softening, and the development of a foul odor, leading to substantial losses in both quality and quantity. Traditional management practices often rely on chemical fungicides, which can have adverse environmental impacts and lead to resistance among pathogens. This has spurred interest in exploring alternative, sustainable approaches, including the use of plant oil extracts.

Efficacy of Plant Oil Extracts

Recent studies have demonstrated the potential of various plant oil extracts in inhibiting the growth of pathogens responsible for jackfruit rot. Here are some notable findings:

1. Essential Oils from Aromatic Plants

Research has shown that essential oils derived from thyme (*Thymus vulgaris*), clove

(*Syzygium aromaticum*), and eucalyptus (*Eucalyptus globulus*) exhibit significant antifungal properties. These oils disrupt the cell membrane integrity of fungal pathogens, leading to cell lysis and death. Thyme oil, in particular, has shown effectiveness against *Fusarium* species which are commonly involved in jackfruit rot.

2. Coconut Oil and Neem Oil

Studies indicated that coconut oil and neem oil significantly reduced the incidence of post-harvest rot in jackfruit. Coconut oil works by creating a barrier that prevents fungal spores from colonizing the fruit surface, while neem oil's active compounds have been shown to inhibit fungal growth and spore germination.

3. Application Methods

Plant oil extracts can be applied through various methods, including immersion, spraying, and the development of edible coatings. Research suggests that a combination of these approaches may enhance the antifungal efficacy, providing a practical solution for farmers.

Mechanism of Action

The antifungal properties of plant oils can be attributed to their bioactive compounds, such as phenolics, terpenes, and aldehydes. These compounds can affect the synthesis of fungal cell wall components and disrupt metabolic processes, leading to the inhibition of growth and eventual cell death. Additionally, the volatile nature of essential oils allows for their diffusion in the environment, providing a protective effect over extended periods.

Conclusion

The management of jackfruit rot disease using plant oil extracts presents a sustainable and eco-friendly approach to protect this valuable fruit from pathogens. Given their effectiveness, further research is warranted to explore the optimal concentrations, application methods, and combinations of different oils. As consumer demand shifts towards organic produce, the adoption of plant-based solutions could significantly benefit jackfruit producers, ensuring healthier crops and enhanced marketability.

References

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