Environment at Crossroads

Challenges and Green Solutions

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Essential oils as next generation fungicides: Contrivances and challenges

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ABSTRACT

Essential oils (EOs), the volatile aromatic oily liquids from higher plants are easily extracted by steam/hydro distillation and contain many low-molecular-weight terpenes and phenolics. Many EOs showed a broad spectrum of antifungal activity against various plant pathogenic fungi promoting their future application as plant based fungicide. Recent investigations pointed that some chemical constituents of these oils inhibit the synthesis of ergosterol in fungi, making them effective antifungal agents. As this target site is confined to fungi and is not shared with other groups, most EO chemicals are relatively non-toxic to mammals in toxicological tests, fulfilling the criteria for "reduced risk" fungicides. Further, many EOs and their components are already registered as safe and are widely used as flavoring agents in foods and beverages. This special regulatory status combined with the wide availability of EOs, can be convinced into fast-track commercialization of EO-based fungicides. Meanwhile, the issue of resistance development against many synthetic fungicides can further be minimized by using EOs owing to the complex mixture of constituents of EO. Ultimately, these "green fungicides have the greatest impact in development of "next generation fungicides" due to their safety to non-target organisms and the environment.

Keywords: Antifungal, essential oil, fungicide, safe.

INTRODUCTION

Fungi cause enormous loss to agricultural products both in the field and storage conditions throughout the globe. Success in reducing the damage of agricultural properties caused by fungi depends greatly on the timely application of fungicides. Chemical control through synthetic fungicides is the most prevalent