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NANOEMULSION BASED ESSENTIAL OILS (EUCALYPTUS AND OREGANO) AGAINST PHYTOPATHOGENIC FUNGI

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ABSTRACT

The deduction in the crop yield due to phytopathogenic fungi is increasing these years. Among which *Mucor sp.*, causes a variety of diseases in crops. Although the botanical substances such as plant extract and essential oils impart high insecticidal and pesticidal activities, their application is not widespread due to its poor physicochemical properties. In order to overcome this problem, nano based synergistic essential oil (eucalyptus and oregano) technology has been deployed. In this study, a non-ionic surfactant was used to create a nanoemulsion from Eucalyptus globus and Origanum vulgare oil utilising a high energy emulsification technique. The Z-average diameter of the nanoemulsion droplets was discovered to be 19nm, and fluorescence microscopy imaging verified the spherical droplet shape of the nanoemulsion. When stored at room temperature (22°C), the nanoemulsion's size was shown to be physically stable for up to one month. The nanoemulsion's minimum inhibitory concentration (MIC) against *Mucor sp.* was 0.151mg/ml. Scanning electron microscopy and sodium dodecyl sulphate polyacrylamide gel electrophoresis were used to demonstrate how the nanoemulsion's ability to break the membrane of *Mucor sp.* The disease in chilli plants was significantly reduced by the use of synergistic nanoemulsion.

KEYWORDS

Eucalyptus oil, Oregano oil, Nanoemulsion and Bio-pesticide.

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INTRODUCTION

Plant pathogens affect a wide range of crops and cause severe losses in economic and agricultural sectors. The world-wide annual production tonnage percentage loss due to microbial diseases estimated in the 21st century is found to be 16% (Moore *et al.*, 2019)¹. The world fungal diseases are caused due to 19,000 fungal species. In India, the reduction in crop productivity caused by pests, diseases and