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Post-harvest pathogen suppression using various essential oils

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Gray mold is the most economically important post-harvest disease caused by *Botrytis cinerea* (Pers.: Fr). It is capable of affecting all aerial parts of the fruit and spreading amongst berries even at low temperature (-0.5°C) to a certain extent, thus creating an environment that is favorable for the growth of other spoilage organisms. In addition to *B. cinerea*, blue mold caused by *Penicillium expansum* is also found to be problematic, causing decay on the table grapes after harvesting leading to an economical loss worldwide. It has rarely being reported on table grapes and mainly associated with wounded grapes. It is therefore important to develop a method that will provide protection against spoilage during preparation, storage, transportation and export shipment. Essential oils has gained an extensive interest in decay control of fungal pathogens, owing to its volatile compounds used as antiseptic, antidepressant, antimicrobial, fungicidal and insecticidal properties. The aim of this study was to test the efficacy of different EOs formulations against *Botrytis cinerea* and *Penicillium expansum* growing on table grapes. An in vitro assay was done to test the antifungal activity of the essential oils using direct contact method and volatile effects on the mycelial growth and spore germination of *Botrytis cinerea* strain PPRI 7338 and *Penicillium expansum* strain PPRI 5944. For the direct method, EO1 and EO2 used singularly exhibited moderate antifungal activity against *Botrytis cinerea* and *Penicillium expansum* for mycelial growth and spore germination with concentrations of 2.5% and 5%, respectively, at 20ºC. Use of EO1 showed more effectiveness in mycelium growth and spore germination inhibition on both fungal pathogens independently and in combination with EO2 and EO3 at concentrations of 2.5-20% at 20ºC (95% Relative humidity). Meanwhile the use of EO3+EO2 showed antifungal activity with less efficacious than EO1+EO2 and EO1+EO3, while EO3 singularly showed no inhibitory effect against *Botrytis cinerea* and *Penicillium expansum* for mycelial growth and spore germination at 20ºC. In volatile effects using phytatray chamber, EO1s showed inhibitory effect against the fungal pathogens at concentration of 0.625-20%, with E02 only from concentration of 5-20%, while E03 showed no inhibitory effect in mycelial growth and spore germination inhibition against these fungal pathogens independently at 20ºC. These results show that EO1 and EO2 singularly and in combination are capable of decay control of gray mold caused by *Botrytis cinerea* and blue mold caused by *Penicillium expansum* and maybe of great importance in development of antifungal agents.

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