

Evaluation of Essential Oils and their Components for Broad-Spectrum Antifungal Activity against *Pythium aphanidermatum*, Causing Damping-off Disease in Tobacco

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Synthetic fungicides are currently used as primary means for the control of plant disease. Besides, the inherent hazards and negative public perceptions about the synthetic chemicals, using of essential oils as novel alternative inhibitory agents against phytopathogens. Essential oils are complex mixtures of hydrocarbons and their oxygenated derivatives arising from two different isoprenoid pathways. The antimicrobial activity of essential oils reduces hyphal growth and also induces lysis and cytoplasmic evacuation in fungi. With this background, The antifungal properties of 6Eos, includes citronella (*Cymbopogon nardus*), lemon grass (*Cymbopogon citratus*), clove (*Syzygium aromaticum*), thulsi (*Ocimum tenuiflorum*), castor (*Ricinus communis*) and *Eucalyptus* (*Eucalyptus globules*) oil were screened. The oils are tested in liquid bioassay (Poison food technique) for confirmation. The test oils at 0.1- 1.00 percent (v/v) were prepared and added to the flasks separately. Tween 80 at 0.01 percent was used as a surfactant to disperse the oil. The contents were thoroughly mixed by placing the flasks on a shaker at 28±2°C. *P. aphanidermatum* (9 mm) culture was aseptically introduced into flasks. The inhibitory effect of oils showed dose-dependent activity on the tested fungus. Based on the MIC Values, *Eucalyptus*, clove, thulsi and citronella were the most effective. With regard to the essential oils screened, *Eucalyptus* oil at (0.1 percent) was found to be superior to other oils tested against *P. aphanidermatum* (isolate Pa₅). We observed MIC minimum inhibitory concentration in *In-vitro* assay. Mode of action involves induction of changes in cell wall composition plasma membrane disruption, mitochondrial structure disorganization. This study warrants further research into the practical use of EOs for the control of important phytopathogens in intensive Agriculture

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