

Title Use of essential oil as botanical-pesticide against post harvest spoilage in *Malus pumilo* fruit

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Abstract

During antifungal screening of the essential oils of some angiospermic plants, oil of *Cymbopogon flexuosus* showed potent bioactivity against dominant post harvest fungal pathogens. The minimum bioactive concentrations with fungicidal action of the oil was found to be 0.2 $\mu\text{l ml}^{-1}$ for *Alternaria alternata*, 0.4 $\mu\text{l ml}^{-1}$ for *Aspergillus flavus*, *A. fumigatus*, *A. niger*, *A. parasiticus*, *Cladosporium cladosporioides*, *Colletotrichum capsici*, *C. falcatum*, *Curvularia lunata*, *Fusarium cerealis*, *F. culmorum*, *F. oxysporum*, *F. udum*, *Gloeosporium fructigenum*, *Penicillium expansum*, *P. italicum*, *P. implicatum*, *P. digitatum*, *P. minio-luteum*, *P. variable*, and 0.5 $\mu\text{l ml}^{-1}$ for *Botrytis cinerea*, *Helminthosporium oryzae*, *H. maydis*, *Phoma violacea*, *Rhizopus nigricans*. The oil exhibited potency against heavy doses (30 mycelial disc, each of 5 mm in diameter) of inoculum at 1.0 $\mu\text{l ml}^{-1}$ concentrations. The bioactivity of the oil was thermostable up to 100°C and lasted up to 48 months. The oil preparation did not exhibit any phytotoxic effect on the fruit skins of *Malus pumilo* up to 50 $\mu\text{l ml}^{-1}$ concentrations. In vivo trials of the oil as a fungicidal spray on *Malus pumilo* for checking the rotting of fruits, it showed that 20 $\mu\text{l ml}^{-1}$ concentration controls 100% infection by pre-inoculation treatment, while in post-inoculation treatment, 30 $\mu\text{l ml}^{-1}$ concentration of fungicidal spray was required for the 100% control of rotting. The fungicidal spray was found to be cost effective (INR 15/l), has long shelf life (48 months) and was devoid of any adverse effects. Therefore, it can be used as a potential source of sustainable eco-friendly botanical pesticide, after successful completion of wide range trials.