

# Microwave-assisted solvent-free extraction of essential oil from *Coleus aromaticus*: anti-phytopathogenic potential for fruit post-harvesting

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## Abstract

This work evaluates the fungicidal effect of essential oil from *Coleus aromaticus* (*C. aromaticus*) by solvent-free microwave-assisted extraction with a yield of 0.54%. Fourier-transform infrared spectroscopy was utilised to identify the functional groups, which were O–H, C–O, C–H, and C=C. Gas chromatography–mass spectrometry analysis was performed to determine the primary essential oil components, namely, thymol (92.62%), thymoquinone (2.64%), creosol (1.77%), linalool (1.68%), *p*-Cymene-2,5-diol (0.73%), and *p*-Cymene (0.56%). The inhibitory effect of essential oil extracted from *C. aromaticus* against the isolated fungi, *Aspergillus niger* from mango, was investigated. The mycelial growth inhibition of the extracted essential oil by the poisoned food test and disc diffusion assay showed the reduction at  $79.63 \pm 1.7$  and  $70.45 \pm 6.54\%$ , respectively. In vivo experiment was conducted with artificially wounded and unwounded mangoes, applying the extracted essential oil to the wounded mangoes inoculated with *A. niger* that could decrease the disease incidence from 100 to  $58.33 \pm 14.43\%$ . Meanwhile, the treatment of the extracted essential oil did not affect the quality of the mango and it also shows improvement in weight loss reduction of the mango in comparison to the chemical fungicide and untreated mango. Hence, essential oil from *C. aromaticus* by solvent-free microwave-assisted extraction could be used as an effective control for the fruit spoilage and potential source of fruit preservative.