

Larvicidal Activity against *Aedes albopictus* mosquito and metabolites profiling using gas chromatography-mass spectrometry of Sweet Basil (*Ocimum basilicum* L.) leaves

Chan CA, Ho LY, Sit NW

Faculty of Science, Universiti Tunku Abdul Rahman, Kampar, Perak, Malaysia

ABSTRACT

Introduction: *Aedes albopictus* (Culicidae) is one of the major vectors for human viral diseases. Applying plant-based larvicides to interrupt the mosquito's life cycle is an important strategy of vector control. **Objective:** This study was conducted to evaluate the hexane extract of sweet basil (*Ocimum basilicum* L.; family Lamiaceae) leaves for larvicidal activity against the wild strain of *Aedes albopictus*. **Materials and methods:** Sixty third instar larvae (20 larvae/replicate) of wild strain *Aedes albopictus* were exposed to six different concentrations of the extract (6.25–200 µg/mL), respectively, and the mortality rate was recorded at 24 and 48 h post-treatment. The extract was subjected to isolation using column chromatography (silica gel 60) to produce 14 fractions. The most active fractions were pooled and chromatographed again to obtain seven subfractions. The metabolites profiling of the most active subfraction was performed using gas chromatography-mass spectrometry (GC-MS). **Results and conclusion:** Probit analysis showed that the median lethal concentration and 95% lethal concentration (95% CI) of the extract at 24-h post-treatment were 16.0 (11.0-22.1) and 53.0 (34.6-136.8) µg/mL, respectively. The corresponding values at 48-h post-treatment were 12.8 (7.6-19.2) and 32.7 (21.1-152.0) µg/mL, respectively. Only the fractions F3, F4, and F5, which were eluted using hexane-acetone mixtures of 8:2, 7:3, and 6:4 v/v, respectively, displayed larval mortality rates of 91.7%-100% at 25.0 µg/mL after 24 h of exposure. The subfraction F345-S2 which was eluted using hexane-acetone (8:2, v/v) demonstrated the strongest larvicidal activity with 100% mortality at 12.5 µg/mL after 24 h of exposure. The GC-MS analysis unveiled the presence of 31 components in the subfraction. Estragole (57.67%), 2-(2-butoxyethoxy)ethanol (10.92%), tau-cadinol (9.92%), methyl eugenol (4.35%), 2,4,di-tert-butylphenol (2.39%), phytol (1.63%), and germacrene D (1.23%) were the major components in the subfraction with some of them being reported as larvicidal compounds. Sweet basil leaves have demonstrated substantial larvicidal activity against the *Aedes albopictus* mosquito and can serve as potential source of naturally-derived larvicides.