

## Antioxidant, mosquito larvicidal and insecticidal activities of essential oil of *Alpinia calcarata* Rosc. rhizome

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*Alpinia calcarata* is (S.Heen – araththa) a rhizomatous perennial herb found in Sri Lanka. The rhizomes of *A. calcarata* are used for medicinal purposes and it contains an essential oil (EO). In our studies we have identified 17 chemical constituents in the EO obtained from rhizomes of *A. calcarata* grown in Sri Lanka. However, only a few investigations on the bio activities of the EO of *A. calcarata* rhizomes have been reported. This study was therefore, carried out to investigate the antioxidant [DPPH<sup>0</sup> (2, 2 – diphenyl – 1 – picrylhydrazyl ) assay], mosquito larvicidal (against the 3<sup>rd</sup> instar larvae of *Anopheles tessellatus*) and insecticidal (against ticks; *Ixodes pacifius*) activities of EO of *A. calcarata* rhizome.

For the antioxidant assay, known concentrations of (0 - 100 µg/ml) EO and the positive control, BHT (butylated hydroxy toluene) were used. The percentage of remaining DPPH<sup>0</sup> (% DPPH<sup>0</sup><sub>REM</sub>) of each dose was calculated as follows; % DPPH<sup>0</sup><sub>REM</sub> = [DPPH<sup>0</sup>]<sub>T</sub> / [DPPH<sup>0</sup>]<sub>C</sub> x 100, where T is the experimental duration time 20 min. and C is the control. The mean effective scavenging concentrations (EC<sub>50</sub>) were calculated by plotting the % DPPH<sup>0</sup><sub>REM</sub> concentrations Vs the concentrations of extract used. This experiment was done twice, each time in triplicates.

In mosquito larvicidal assay, EO at 250, 500, 750 and 1000 ppm concentrations were prepared in ethanol and introduced into beakers containing 20 larvae of *A. tessellatus*. The mortality percentage was then calculated at 1h, 3h, 6h & 24h intervals. Ethanol served as the control. Experiments were carried out in triplicates.

In insecticidal assay, a filter paper was impregnated with EO solution, air dried, placed in a petri dish, and 10 adult *I. pacifius* were introduced. KD (knock down) effect and the mortality of the ticks were calculated. Experiments were carried out in triplicates. Ethanol served as the control.

In DPPH assay, EC<sub>50</sub> value of the EO was 45.2 ± 1.1 µg/mL. In mosquito larvicidal assay, both 750 and 1000 ppm doses showed 100 % mortality against larvae of *A. tessellatus* at 1 h. Further in insecticidal assay, all the tested concentrations of EO showed 100 % KD effect within 30 min. and 100% mortality against *I. pacifius* at 942 and 1099 µg / cm<sup>3</sup> concentrations within 4 h. However, 100 % mortality was recorded after 24 h. In conclusion, this study revealed that essential oil of *A. calcarata* rhizomes possesses moderate antioxidant, mosquito larvicidal and insecticidal properties.

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