

ABSTRACT

This study will aim to investigate the antilarvicidal activity of *Dahlia pinnata* against *Aedes aegypti* through phytochemical screening and *in silico* and *in vitro* larvicidal analysis. The plant samples of *Dahlia pinnata* were collected, identified and processed for extraction. Phytochemical screening test were performed to detect bioactive compounds. The presence of various secondary metabolites such as alkaloids, flavonoids, phenols, tannins and terpenoids in both extract which are known to possess insecticidal and antiviral properties. Molecular Docking studies were conducted by virtually docking the bioactive compounds of *Dahlia pinnata* onto the target proteins of the *Aedes aegypti*. *In vitro* larvicidal assays were performed using serial dilution of the plant extract solution and to determine the morphological changes in the mosquito larvae. This study investigated the larvicidal potential of *Dahlia pinnata* flower extract against *Aedes aegypti* larvae through an integrated approach combining computational (*in silico*) and laboratory-based (*in vitro*) methodologies. In the *in silico* phase, molecular docking studies were conducted to predict the potential interactions between cis-10-Nonadecenoic acid and 2-Bromooctadecanal compounds present in *Dahlia pinnata* extract and molecular targets within *Aedes aegypti* larvae. This computational analysis provided insights into the molecular mechanisms underlying the larvicidal activity of the extract, facilitating the identification of key compounds responsible for its efficacy. Subsequently, in the *in vitro* phase, larvicidal assays were performed to validate the predictions from the computational analysis. Mortality rates for both fresh and dry *Dahlia pinnata* extracts were examined at concentrations of 50, 100, 150, and 200 µg/mL, with 12, 24, and 36-hour incubations. At 50 µg/mL, fresh extract rates were 25%, 53.3%, and 100%, while dry extract rates were 20%, 37.5%, and 100%. At 100 µg/mL, fresh extract rates were 25%, 53.3%, and 100%, and dry extract rates were 20%, 43.8%, and 100%. At 150 µg/mL, fresh extract rates were 35%, 53.8%, and 100%, and dry extract rates were 30%, 50%, and 100%. At 200 µg/mL, fresh extract rates were 30%, 42.8%, and 100%, and dry extract rates were 40%, 50%, and 100%. A series of experiments were conducted to evaluate the concentration-dependent effects of *Dahlia pinnata* flower extract on the mortality rate of *Aedes aegypti* larvae. The results confirmed significant larvicidal activity, with increasing concentrations of the extract correlating with higher mortality rates among the larvae.