

## INVESTIGATE THE LARVICIDAL EFFICIENCY OF SELECTED BOTANICAL PLANT EXTRACTS AGAINST DENGUE VECTOR *Aedes* sp.

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The global rise in mosquito-borne diseases, particularly dengue fever, emphasizes the need for eco-friendly vector control methods. This study investigates the larvicidal potential of five medicinal plants such as *Nicotiana tabacum* (Tobacco), *Acorus calamus* (Sweet Flag), *Pongamia pinnata* (Pungam), *Calotropis* sp., and *Aristolochia bracteolata* (Worm Killer) against *Aedes* sp. larvae. All selected plant extracts were prepared by using methanol as a solvent and larvicidal mortality was assessed 24 hrs with different concentration ranges from 25-500 ppm for each extract. The highest mortality was observed in *Acorus calamus* with 98.00%  $\pm$  2.45 reduction at 500 ppm alongside the lowest LC50 of 58.07 ppm  $\pm$  0.80, LC90 of 557.82  $\pm$  0.75 and LC99 of 1103.22  $\pm$  0.75. *Calotropis* sp. demonstrate moderate effectiveness with a 93.00%  $\pm$  2.45 mortality rate at 500 ppm and an LC50 of 97.27 ppm  $\pm$  0.75. In contrast, *Aristolochia bracteolata* was the least effective, resulting in a mortality rate of 67.00%  $\pm$  5.10 at 500 ppm, an LC50 of 330.47 ppm  $\pm$  0.4, an LC90 of 1208.20  $\pm$  0.63, and an LC99 of 2166.09  $\pm$  1.02. One-way ANOVA confirmed significant differences in mortality across extracts ( $p < 0.001$ ), and Tukey's post-hoc test revealed *Acorus calamus* was significantly more effective than *Pongamia pinnata* and *Aristolochia bracteolata* ( $p < 0.05$ ). Regression analysis indicated a strong dose-response relationship for all extracts, with *Acorus calamus* showing the highest regression coefficient (0.22) and *Aristolochia bracteolata* the lowest (0.08). Phytochemical screening identified key bioactive compounds such as phenols, terpenoids, and alkaloids. Effect size analysis (Cohen's  $d = 1.72$ ) between *Acorus calamus* and *Aristolochia bracteolata* highlighted substantial differences in efficacy. These findings demonstrate the strong potential of *Acorus calamus* as a promising natural larvicide, while *Aristolochia bracteolata* is less effective, suggesting that a higher concentration or combination of plant extracts might be needed for optimal mosquito control.

**Keywords:** *Aedes* sp., Dengue vector control, Larvicidal activity, Medicinal plants, Natural insecticides.