

Larvicidal and ovicidal activity of *Phyllanthus emblica* (Nelli) leaf extract against dengue vectors, *Aedes aegypti* and *Aedes albopictus*

MO Galappaththi, AA Jabeer, F Noordeen

Introduction and Objectives: The main approach to control dengue involves targeting oval and larval stages of the *Aedes* vectors. Chemical larvicides are toxic to humans and non-target organisms that may lead to development of resistance. Natural products with bio-origin are safe and eco-friendly. The objective of the study was to test the ovicidal and larvicidal activity of *Phyllanthus emblica* leaf extract against *Ae. aegypti* and *Ae. albopictus*.

Methods: *P. emblica* leaves were ground using mortar and pestle and different concentrations (5%, 10%, 15%, 20% (v/v)) were prepared using fresh extract in distilled water. *Aedes* eggs were obtained from the Molecular Medicine Unit, University of Kelaniya and the hatched egg numbers were recorded after 12 hours. The eggs were maintained in spring water containers at room temperature and eggs hatched into fourth instar larvae within 3-4 days. The larvicidal activity was tested against the fourth instar larvae and the number of dead larvae was recorded every 12 hours up to 48 hours. Four replicates were used for each experiment. Percentage larval and oval mortality and the relevant LC₅₀, LC₉₀ values were calculated using SPSS 16 software-probit analysis.

Results: *Phyllanthus emblica* leaf extract showed ovicidal and larvicidal activity against both *Aedes* species at 20% (v/v) concentration. The LC₅₀ and LC₉₀ results for *Ae. aegypti* and *Ae. albopictus* are given in Table 1.

Table 1: The percentage mortality, LC₅₀ and LC₉₀ values for *Ae. aegypti* and *Ae. albopictus* after 12 hours of treatment with *Phyllanthus emblica* leaf extract.

Test		<i>Ae. aegypti</i>	<i>Ae. albopictus</i>
Ovicidal activity	Mortality at 20% (v/v) concentration	96%	97%
	LC ₅₀ (v/v)	3.58%	1.18%
	LC ₉₀ (v/v)	27.41%	7.67%
Larvicidal activity	Mortality at 20% (v/v) concentration	93%	93%
	LC ₅₀ (v/v)	2.88%	7.92%
	LC ₉₀ (v/v)	19.5%	31.75%

Conclusions: *Phyllanthus emblica* leaf extract showed ovicidal and larvicidal activity against *Ae. aegypti* and *Ae. albopictus*. The extract can be developed as an eco-friendly substitute for synthetic ovicide /larvicide, and these findings show the possibility for further efficacy testing for the synergistic ovicidal /larvicidal properties of *P. emblica* leaf extract.

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Keywords: *Ae. aegypti*, *Ae. albopictus*, larvicidal & ovicidal activity, *P. emblica* leaf extract

¹Teaching hospital Peradeniya, Peradeniya, Sri Lanka

Address for correspondence: Prof Faseeha Noordeen. Telephone: +94772293301

Email: faseeha.noordeen12@gmail.com  <https://orcid.org/0000-0002-2018-0606>