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MOSQUITO LARVICIDAL ACTIVITIES OF ROTENOIDS FROM *ADENANTHERA PAVONIANA* L. AGAINST *AEDES AEGYPTI* LARVAE

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In the present investigation, larvicidal activity of rotenoids obtained from seeds, leaves, pods (without seed) and petiole of *Adenanthera pavoniana* L. (Family:Fabaceae) was tested against *Aedes aegypti* (Diptera: Culicidae) larvae under laboratory conditions. This plant possesses insecticidal properties, but larvicidal activities of secondary metabolites have not been reported so far. Rotenoids (a group of ketonic compounds) from seed extract of *A. pavoniana* exhibited highest larvicidal activity followed by pods (without seeds), leaves and petiole with LC_{50} value at 14.38, 51.31, 237.24 and 238.61ppm, respectively.

Keywords: *Adenanthera pavoniana; Aedes aegypti;* Larvicidal; Rotenoids.

Mosquitoes in the larval stage are attractive targets for pesticides because they breed in water and, thus, are easy to deal with them in this habitat. The alternative means of control are needed because of the growing incidence of insect resistance to synthetic insecticides[1]. Rotenone, one of the most extensively used natural insecticides, was reported to be highly toxic to the 4th instar larvae of *Aedes aegypti*[2]. Commercially, rotenone is mainly extracted from the roots of *Derris* species in Asia and *Lonchocarpus* species in South America[3]. Rotenoids are also known to occur in several plants, belonging to the family Leguminosae[4]. The present study deals with the larvicidal activities of crude rotenoids isolated from different parts of *Adenanthera pavoniana* L plant (Family: Fabaceae; common name coralwood, red bead tree, sandalwood).

Plant material was collected from the locally available site in and around the campus of Haffkine Institute. Different parts of the plant were dried and powdered separately. Extraction and confirmation of rotenoids were carried out using the reference method[5].

Larvicidal bioassay- Laboratory-reared *Aedes aegypti* were used for larvicidal bioassay under laboratory conditions (27± 2°C and 75 ± 5 % RH). Larvicidal bioassay was carried out as per World Health Organization standard protocols in 500 ml glass beakers containing 250 ml of declorinated water[6]. The rotenoid extracts were diluted in acetone and different concentrations were pipetted out into the testing beakers to prepare a homogeneous mix. Twenty-five mosquito larvae of early fourth instars were released in each beaker for 24 h with a concurrent control, one with acetone (1ml) and other with water (250ml) for every set of experiment. Three replicates were kept for each concentration. No food was added in the beaker as per WHO norms. Mortality was recorded after 24 h of treatment by counting dead and moribound larvae. Pupated larvae were discarded. Corrected mortality was calculated by Abbot's formula[7].

$$\text{Corrected mortality} = \frac{\text{\% Test mortality - \% control mortality}}{\text{100 - \% control mortality}} \times 100$$

The crude rotenoid extract of seeds of *Adenanthera pavoniana* L. showed highest larvicidal activity (LC_{50} value at 14.38 at 24 hours) against early fourth-instar larvae of the mosquito, *Aedes aegypti* (Diptera: Culicidae). Rotenoids obtained from pods (without seeds), leaves and petiole were active at comparatively higher concentration with LC_{50} value at 51.31 237.24 and 238.61 ppm, respectively (Table 1). Larval mortality in control was nil.

Plant could be an alternative source for mosquito larvicide because they constitute a potential source of bioactive compounds and generally free from harmful effects[8]. Rotenone from *Derris eliptica* have been used as natural insecticides even before the discovery of synthetic organic insecticides[9]. Although several plants have been reported for mosquito larvicidal activity restricted to preliminary screening[10]. Rotenoids from seeds of *Adenanthera pavoniana* L. exhibited larvicidal activity at significantly lower concentration as compared to other parts of the plant tested. Further studies on identification of active compounds, toxicity and field trials are needed to recommend the active fraction of these plants extracts

Table 1. Activities (LC_{50} value in ppm) of crude rotenoids obtained from different parts of *Adenanthera pavoniana* L against *Aedes agypti* mosquito larvae.

Plant part	% Mortality of larvae after 24 hours*						LC_{50}	LC_{90}
	Different concentrations in ppm							
	25	50	100	150	300	450		
Seeds	30.33±1.23	64.00±1.02	78.33±0.97	94.66±1.35	100.00±0.00	100.00±0.00	14.38	202.97
Pods (without seeds)	26.66±1.46	52.00±0.98	68.66±1.16	92.00±1.32	100.00±1.34	100.00±0.00	51.31	216.26
Leaves	0.00	0.00	14.00±1.21	38.66±1.65	68.66±1.43	96.33±1.09	237.24	405.28
Petiole	0.00	0.00	8.33±1.18	44.00±1.06	74.00±1.19	90.66±1.22	238.61	410.39

* Mean of three replicates (Mean±S.E.M.)
LC_{50} and LC_{90}= Lethal concentration giving 50% and 90% mortality.

for development of new eco-friendly chemical for control of insect vector.

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