

Short communication



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Screening of plant extracts for larvicidal activity against *Culex quinquefasciatus*

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Abstract

Objective: To investigate the activity of some selected Indian medicinal plant against larvae of mosquito *Culex quinquefasciatus*. **Materials and methods:** The plants viz. *Acorus calamus* (rhizomes), *Allium sativum* (bulbs) and *Gardenia gummifera* (dried exudates) were selected for the study. The plant materials were extracted successively with petroleum ether, chloroform, ethanol and 40% ethanol using soxhlet apparatus. Extracts of the three plants were subjected to larvicidal activity. **Results:** The ethanolic extract of *Acorus calamus* was most active among the other extracts with an LC_{50} of 0.072 and LC_{90} of 0.243. **Conclusion:** It can be concluded that *A. calamus* and *G. gummifera* may be exploited commercially as larvicidal agents.

Key Words : Larvicidal activity, mosquito, culex, Natural insecticide

1. Introduction

Mosquito larvicides from plant origin have been reported to overcome the environmental hazards associated with using synthetic chemicals in mosquito control programmes [1]. Pyrethrum from the flower heads of *Chrysanthemum cinerariaefolium* was known for its antilarval activity [2]. Limonoids such as azadiractin and gedunin, present in species from the meliaceae and rutaceae are recognized for their toxic

effects on insects and are used in several insecticide formulations [3]. A number of unsaturated amides with larvicidal activity were reported from composite, piperaceae and rutaceae families [4]. The present study reports the activity of some selected Indian medicinal plant samples against the larvae of mosquito *Culex quinquefasciatus* the vector of bancroftian filariasis in India.

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Materials and methods

2.1 Plant Materials

Roots of *Acorus calamus*, bulbs of *Allium sativum* and dried exudates of *Gardenia gummifera* were collected and authenticated from Indian herbs, herbal industry, Bangalore, where the voucher specimen is preserved.

2.2 Extraction

Dried and powdered samples were successively extracted with petroleum ether, chloroform, ethanol and 40% ethanol using soxhlet apparatus. The solvents from the extracts were removed using a vacuum evaporator.

2.3 Test materials

Petroleum ether, chloroform, ethanol and 40% ethanol extracts of *Acorus calamus*, *Allium sativum* and *Gardenia gummifera* were used as test materials.

2.4 Collection of Larvae

Larvae of *Culex* spp. were collected from Rallis India Limited, Bangalore. Studies on larvicidal activity against *Culex* larvae revealed that the young larvae were very susceptible to different room temperatures. One week old larvae of *Culex quinquefasciatus* were found to be best suited for larvicidal activity. The larvae were reared on protein food in water.

2.5 Test solutions

The stock solutions (50 mg/ml) for all extracts were prepared in the form of suspension in 1% demethyl sulphoxide (DMSO) in water. Test solutions were prepared in different concentrations by diluting the stock solution, using 1% DMSO in distilled water and activity was tested to find out the lethal concentrations.

2.6 Experimental design

Extracts of the three plant samples were subjected to larvicidal activity based on experiments

Table 1
Determination of efficacy of active extracts against *Culex mosquito* larvae

Insecticide	Conc mg/ml	Percentage mortality	LC ₅₀ mg/ml	LC ₉₀ mg/ml
<i>Acorus calamus</i> ethanolic extract	0.5	100	0.0727	0.2437
	0.25	90		
	0.125	70		
	0.0625	40		
	0.0312	25		
<i>Gardenia gummifera</i> 40% ethanolic extract	10	100	3.52	10.26
	5	55		
	2.5	30		
	1.25	20		
	0.625	10		
<i>Alium sativum</i> ethanolic extract	20	100	14.56	20.55
	17.5	65		
	15	50		
	12.5	30		
Control	10	10		
	1% DMSO in water	0		

conducted by Thangam [5]. Test solutions were taken in 100 ml beakers containing 50 ml of water separately. 20 larvae were released into beakers containing test solutions.

Control was run using 50 ml of water without test material. Number of dead larvae was counted after 24 hrs. The larvae were considered dead if they were immobile and unable to reach the water surface. The LC_{50} and LC_{90} of active extracts were calculated using standard method of probits [6].

3. Results and Discussions

The results suggested that the ethanolic extracts *Acorus calamus*, *Allium sativum* and

40% ethanolic extract of *Gardenia gummifera* were found to be most active with 100% morality. All other extracts were less active or inactive.

The results of the efficacy of active extracts are presented in Table 1. The data indicate that ethanolic extract of *Acorus calamus* was most active with LC_{50} of 0.0727 and LC_{90} of 0.2437 mg/ml. Forty percent ethanol extract of *Gardenia gummifera* was found to be moderate active with LC_{50} of 3.52 and LC_{90} of 10.26 mg/ml. With our results it can be concluded that *Acorus calamus*, *Gardenia gummifera* could be exploited commercially as larvicidal agents.

References

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