

Research Article

Studies on *Costus speciosus* Koen Alcoholic Extract for Larvicidal Activity

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ABSTRACT

Mosquito borne diseases are one of the biggest health problems prevailing in the developing and developed countries also. Larviciding is a successful way of reducing mosquito densities in their breeding places before they emerge into adults. The present study aims at exploring the *Costus speciosus* Koen alcoholic extracts of leaf, rhizome and stem for larvicidal property. Larvicidal potential of stem, leaf and rhizomes of *Costus speciosus* alcoholic extracts were evaluated against third and fourth instar larvae (*Aedes aegypti*). The alcoholic extracts were prepared by maceration technique, and the larvicidal assay was carried out at 5 test concentrations of 100, 250, 500, 1000, 2000 µg/ml. Larvicidal potential was determined at 0, 1, 2, 3, 4, 5, 6, 12 and 24 hours and the percentage mortality was calculated. All the extracts had shown dose dependent activity with the maximum larvicidal potential was seen at 2000mcg/ml for leaf followed by stem and rhizome. It can be concluded that, larvicidal potential of the leaves are better than that of the other parts such as rhizomes and stem.

Key words: Mosquito, larvicidal, *Costus speciosus* and *Aedes aegypti*.

INTRODUCTION

Mosquito borne diseases are one of the world's most health hazardous problems.¹ Mosquitoes serve as a major vector for the transmission of numerous diseases such as malaria, dengue fever, yellow fever, filariasis, schistosomiasis and Japanese encephalitis.^{2&3} *Aedes aegypti*, a vector of dengue and dengue hemorrhagic fever, which is a widely distributed tropical and subtropical disease, is now endemic in more than 100 countries and threatens the health of approximately 2.5 billion people.⁴ The control of these larvae primarily depends upon various synthetic agents such as organophosphates, which may later leads to the environmental and health concerns on repetitive usage.⁵ These problems leads to the development of newer larvicidal drug of commercial importance.

Costus speciosus Koen is an erect plant, up to 2.7 meters high of Zingiberaceae family. It is freely cultivated in rainy seasons. The rhizomes are found to be a good source of steroidal saponins tigogenin and diosgenin.⁶ The plant is well known for its various traditional uses such as aphrodisiac, treatment of leprosy, skin diseases and inflammations etc. The present study aims at evaluating the larvicidal potential of the alcoholic extracts of leaf, stem and rhizomes of *Costus speciosus* Koen.

MATERIALS AND METHODS

Collection of plant material: The leaves, stem and rhizomes of *Costus speciosus* was collected from in and out skirts of chelembra and the same was authenticated by Dr A.K Pradeep, Herbarium curator, Department of Botany, Calicut University, Malappuram.

Preparation of extracts: The collected materials were shade dried and powdered. The powdered plant material was extracted using cold maceration technique. All the extracts were dissolved in water prior to use for the study. Larvicidal assay: The larvicidal assay was carried out with the help of third and fourth Instar larvae of *Aedes aegypti*. The study was carried out at a test concentration of 100, 250, 500, 1000, 2000 µg/ml of alcoholic extract of leaf, stem and rhizome of *Costus speciosus*. One ml of different concentration of the extracts was added to water in a beaker and final volume of was maintained at 250ml for all extract samples. 20 larvae per concentration were used for the study. The number of dead larvae at 0, 1, 2..... 24 hours was recorded and the percentage mortality was calculated. A control group was maintained using only water. The study was performed in triplicate and the average of the study is taken.^{1,6-8}

RESULTS AND DISCUSSIONS

Kerala is a rich source of flora. But till today exploring of these rich resources remain at the base level. In this current study, an attempt has been made to untap one of the Zingiberaceae family that is *Costus speciosus* Koen for its larvicidal potential. In the present study the efficacy of the alcoholic extracts of the rhizomes, stem and leaves were evaluated against third and fourth Instar larvae of *Aedes aegypti* at various concentrations of 100, 250, 500, 1000, 2000 µg/ml. The results were shown in the Table: 01. The extract was evaluated at 0, 1st, 2nd, 3rd, 4th, 6th, 12th and 24th hour. The evaluation clearly shows all the extracts exhibits larvicidal property dose dependently. The larvicidal potential of *Costus speciosus*

Table : 1 Evaluation of larvicidal potential of *Costus speciosus* Koen

Treatment	Concentration (µg/ml)	Percentage Mortality							
		0 hr	1 st hr	2 nd hr	3 rd hr	4 th hr	6 th hr	12 th hr	24 th hr
Control	-	00	00	00	00	00	00	00	00
Rhizome	100	00	00	00	00	00	00	00	00
	250	00	00	00	00	00	00	00	00
	500	00	00	00	00	00	00	00	00
	1000	00	00	00	00	00	00	00	00
	2000	00	00	05	05	10	10	15	15
Stem	100	00	00	00	00	00	00	00	00
	250	00	00	00	00	00	00	00	00
	500	00	00	00	00	05	05	10	10
	1000	00	00	05	10	10	10	15	15
	2000	00	05	10	15	15	15	20	20
Leaves	100	00	00	05	10	10	10	15	15
	250	00	00	10	15	15	15	20	20
	500	00	05	10	15	15	20	20	25
	1000	00	05	10	15	20	20	25	25
	2000	05	10	15	20	25	25	30	35

Koen was in the following order: Leaves > Stem > Rhizome.

Mosquitoes are one of the biggest threat among the public in creating most health problems in the developing and developed countries. They can be controlled by using mosquito repellent, causing larval mortality and killing mosquitoes. Undoubtedly, plant derived toxicants are valuable source of potential insecticides. They play a major role in mosquito control programs in near future.⁹ So, there is always a tremendous need in plant insecticides throughout the globe. These plant derived insecticides are effective against specific target insects, less expensive, easily bio degradable and to non toxic products.¹⁰

CONCLUSIONS

It can be concluded that, larvicidal potential of the leaves are better than that of the other parts such as rhizomes and stem. Though the efficacy of the leaves were moderately significant, further isolation and purification of isolated compounds may attribute towards desired drug with significant larvicidal effect.

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