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# Studies on *Millingtonia Hortensis* Linn.F Stem Bark for Larvicidal Properties

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**Abstract :** Objectives: *Millingtonia hortensis* Linn.F (Bignoniaceae) is a traditional medicinal plant widely used in south -East Asia for its fragrant flowers. It is commonly known as Cork tree, Akash neem and Neem chameli. 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 larvicidal properties of aqueous extract of stem bark of *Millingtonia hortensis* Linn.F. Methods: The study was carried out against 3<sup>rd</sup> and 4<sup>th</sup> instar larvae of *Aedes aegypti* at 100µg/ml, 250µg/ml, 500µg/ml, 750µg/ml and1000µg/ml for a period of 24h. Results: The extract was found to be a poor larvicidal drug with a maximum larvicidal morbidity of 31.66% after 24h for the highest dose of treatment. Conclusions: Thus it can be concluded that *Millingtonia hortensis* L.F stem bark aqueous extract is a poor larvicidal drug of choice.

Key Words : Millingtonia hortensis, Larvicidal and Aedes aegypti.

## Introduction

Mosquito borne diseases are one of the biggest world's health hazardous problems. These tiny creatures serves as a major vector for the transmission of numerous diseases such as malaria, dengue fever, yellow fever, filariasis, schistosomiasis and Japanese encephalitis<sup>1</sup>. *Aedes aegypti*, a vector of dengue and dengue hemorrhagic fever, which is widely distributed tropical and subtropical disease, is now endemic in more than 100 countries and threatens the health of approximately 2.5 billion people<sup>2</sup>. Most of the commonly available larvicidal agents are of synthetic importance of organophosphates class, which may leads to the environmental and health concerns on repetitive usage<sup>3</sup>. These factors attribute to the research of newer larvicidal drugs of commercial importance.

*Millingtonia hortensis* Linn (Bignoniaceae)-is an ornamental tree, grown in gardens and parks as an avenue tree. The tree has its wide spread throughout south Asia, especially in India. The tree is easily identified by its highly scented fragrant flowers and it is a rich source of essential oil, flavonoids, tannins and alkaloids<sup>4</sup>. In the Thai folkfore medicine, the tree is used as antipyretic, sinusitis, cholagogue and tonic<sup>5</sup>. In the present study, an attempt had been made to evaluate the larvicidal potential of the stem bark aqueous extract of *Millingtonia hortensis* Linn.F (Bignoniaceae), in order to bring it out as an effective drug and to serve the humanity with less or no side effects.

## **Plant Material**

*Millingtonia hortensis* Linn (Bigoniaceae) trees were identified and authenticated by Dr. N. Ravichandran, Botanist and the herbarium specimen of the same was deposited in, Centre for Advanced Research in Indian System of Medicine, SASTRA University, Thanjavur (Specimen number: SASTRA 103). The barks were collected using coppicing technique in the month of September – October and shade dried.

#### The extract

Shade dried barks of *Millingtonia hortensis* Linn (Bignoniaceae) was coarsely powdered and passed through sieve # 10. 100gms of this sieved powder was weighed accurately and subjected to aqueous extraction by maceration technique. The extract prepared was filtered and condensed by vacuum evaporator.

#### 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, 750, 1000  $\mu$ g/ml of aqueous extract of stem bark of *Millingtonia hortensis* L.F. One ml of different concentration of the extract 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<sup>6,7,8</sup>.

## **Statistical Analysis**

Results were expressed as mean  $\pm$  SEM. The means were analyzed using unpaired t test. Differences with values of p<0.05 were considered statistically significant.

#### **Results and Discussions**

In the present study the aqueous extract of stem bark of *Millingtonia hortensis* L.F was evaluated for its larvicidal property against the common household mosquito - third and fourth Instar larvae of *Aedes aegypti*. The study was carried out for a period of 24hrs against 100, 250, 500, 750, 1000  $\mu$ g/ml of the extract. Percentage mortality was calculated after 24hrs. The study revealed that the drug possess significant morbidity after 24hrs dose dependently as compared to the negative control group.

	CONCN	Number of Dead Larvae								
Treatment		0hr	1 <sup>st</sup> hr	2 <sup>nd</sup> hr	3 <sup>rd</sup> hr	4 <sup>th</sup> hr	5 <sup>th</sup> hr	6 <sup>th</sup> hr	12 <sup>th</sup>	24 <sup>th</sup>
									hr	hr
Water	Control	0/20	0/20	0/20	0/20	0/20	0/20	0/20	0/20	0/20
Millingtonia	100mcg/ml	0/20	0/20	0/20	0/20	0/20	0/20	0/20	0/20	2/20
hortensis	250mcg/ml	0/20	0/20	0/20	0/20	0/20	0/20	0/20	1/20	2/20
aqueous	500mcg/ml	0/20	0/20	0/20	0/20	0/20	1/20	2/20	3/20	4/20
extract	750mcg/ml	0/20	1/20	1/20	1/20	2/20	2/20	3/20	4/20	5/20
	1000mcg/ml	0/20	1/20	1/20	2/20	2/20	3/20	4/20	5/20	6/20

Table: 01 Evaluation of Larvicidal potential of *Millingtonia hortensis* L.F stem bark aqueous extract

One of the biggest threats for the common man which creates health problems is the mosquitoes. Till now there are various techniques that are prevailing in the world to control these tiny creatures, such as mosquito repellent, causing larval mortality and killing mosquitoes. Undoubtedly, the plant derived toxicants are the most valuable source for potential insecticides and they play a huge role in mosquito control programmes by near future<sup>9</sup>. So, there is always a tremendous need in plant insecticides throughout the globe. These plant derived insecticides are effective against specific class of target insects and they are less expensive and easily biodegradable and non toxic too<sup>10</sup>. *Millingtonia hortensis* Linn (Bignoniaceae)-is a large ornamental tree, grown in gardens and parks as an avenue tree, less known for its pharmacological actions. The stem bark of these trees is evaluated for its larvicidal potential against the household mosquito- third and fourth Instar larvae of *Aedes aegypti*. The study revealed that the drug possess significant morbidity after 24hrs dose

dependently as compared to the negative control group. However, these results were not highly significant so as to develop this drug as a novel larvicidal drug of commercial importance.

Table : 02 Percentage mortality of d	lead larvae after 24hrs
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Treatment	CONCN	Number of Dead Larvae (Percentage mortality)
		after 24hrs
Water	Control	$00.00 \pm 0.00$
Millingtonia	100mcg/ml	11.66±0.33***
hortensis	250mcg/ml	13.66±0.33***
aqueous	500mcg/ml	20.00±0.57***
extract	750mcg/ml	26.66±0.33***
	1000mcg/ml	31.66±0.33***

All the values are mean ± SEM and compared to control group; \*\*\*p<0.001, n=3

## Conclusions

It can be concluded that, *Millingtonia hortensis* L.F stem bark aqueous extract possess larvicidal property as compared to the negative control group. Since the maximum percentage of morbidity is only 31%, which is very negligible as compared to the marketed larvicidal drugs, *Millingtonia hortensis* L.F stem bark cannot be tried as a novel larvicidal drug of commercial importance.

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