Mosquito Repellent Activity of *Tridax procumbens* Leaves- A Commercial Product

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ABSTRACT

Tridax procumbens is a weed plant native to tropical America and also seen in other tropical regions. Recent studies on the seed germination of *Tridax procumbens* showed that they are pH resistance and they are able to grow in sea water. Although *Tridax procumbens* is used as a medication plant in Ayurveda, the plant is famous for its wound healing and anticoagulation activity in modern days. As it is the asteraceae family, WHO claims that terpenoids and triterpenoids present in them have a strong insecticidal property. This study is carried to know the insecticidal property of *Tridax procumbens* leaves against mosquitos.

KEYWORDS: *Tridax procumbens*, Insecticidal property, Mosquitos, Mosquito Repellent, Triterpenoids

I. INTRODUCTION

Tridax procumbens Linn. (Tridax) family Composite regularly known as 'Ghamra' and in English prevalently called 'coat catches' a result of appearance of blossoms has been broadly utilized in Ayurvedic arrangement of medication for different afflictions and is administered for "Bhringraj" by a few of the specialists of Ayurveda which is well known medication for liver issue. (Bhagwatet al. 2008)

Kingdom : Plantae
Sub Kingdom : Tracheobionta
Division : Magnoliophyta
Class : Magnoliopsida
Sub Class : Asteridae

Order : Asterales
Family : Asteraceae
Genus : *Tridax*
Species : *procumbens*

Coat catches are found along side of the road, squander grounds, embankments, railways, riverbanks, glades, and rises. Its broad circulation and significance as a weed are because of its spreading stems and copious seed creation. *Tridax* is seven days straying herb around 12 – 24 cm long with barely any leaves 6 – 8 cm long and exceptionally long thin single peduncles a foot or more long. Leaf is straightforward, inverse, exstipulate, praise, intense with two kinds of blossoms, for example, ray florets and disc florets.

Figure 1. *Tridax procumbens*

Tridax procumbens ordinarily known as "Thatapoodu" in tamil is known for a few potential remedial exercises like antiviral, anti-infection efficacies, wound healing, insecticidal and anti-inflammatory action. (Everitt *et al.* 2007)

Plants being a characteristic wellspring of different mixes are known to contain larviciding operators, which may act in blend or freely. A few phytochemicals go about as general toxicants both against the grown-up just as larval phases of mosquitoes, while others meddle with the development and improvement, multiplication, produce olfactory upgrades activities as an anti-agents or attractant. (Ghayalet *et al.* 2010)

Natural items are best choice since it is less destructive to environment and non - targeted living beings. A few concentrates and compound from various plants families have been assessed for new and promising larvicides. (Ester *et al.* 2008)

Mosquitoes are the vectors for different deadful ailments of humankind. Of the considerable number of bugs that transmit ailments, mosquitoes speak to the most noteworthy threat. World Health Organization (WHO) has proclaimed mosquitoes as general wellbeing bug all through the world as they are liable for the transmission of different infection causing pathogens. (WHO *et al.* 1996)

II. MATERIALS AND METHODS

III. COLLECTION OF PLANT MATERIAL

The sample used in the present study was *Tridax procumbens* leaves collected from Dr. N. G. P. Arts and Science College, Coimbatore, Tamil Nadu, India. The plant was authenticated by Tamil Nadu Agriculture University, Coimbatore. The collected plant leaves were washed thoroughly in running tap water to remove the surface microflora and adherents, shade dried, finely powdered and stored in airtight container for future use.

IV. EXTRACTION OF PLANT LEAVES

Extraction of plant leaves was carried out in a simplest way, thinking that it could be easy for the local communities to adopt this method. The extraction of powdered leaves sample was done by 10 g of leave powder was placed in 100 ml of distilled water was added and mixed vigorously. The mixture was kept for 3 days with shaker at 100 rpm, mixture was filtered using a fine muslin cloth and the extraction was concentrated.

V. PHYTOCHEMICAL ANALYSIS

The phytochemical analysis screening was carried out for with aqueous extract of leaves sample using standard procedures. The analysis of the presence of several phytochemical was listed in Table 1.

VI. LARVICIDAL BIOASSAY

The mosquito larvae were *Culex quinquefasciatus* were collected from National Center for Disease Control, Mettupalayam. Larvicidal assay of the crude extract were conducted using the fourth instar larvae of *Culex quinquefasciatus*. A total of three trials were carried out against vector mosquitoes for larval susceptibility test. Stock solution (1000ppm) of the extract was prepared by dissolving 100 mg of crude extract in 1 ml acetone and volume raised to 100 ml with distilled water. From this different dilution of 50ppm, 100 ppm, 150 ppm, 200 ppm and 250 ppm were prepared in 200 ml deionized water and 25 fourth instar larvae were released in it and mortality was scored after 24 h and 48 h the results were noted. The beakers were kept in a temperature control room at $28^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and the larvae were exposed to 200 ml water containing served as control. All the above experiment results were collected and mortality rate was corrected by Abbott's formula (1925).

$$\text{Mortality} = \frac{\% \text{ alive control} - \% \text{ alive treated}}{\% \text{ alive in control}} \times 100$$

VII. STATISTICAL ANALYSIS

The average larval mortality data were subjected for calculating probit analysis in EXCEL for LC50 value. These calculation are based on the method of Finney (1952).

VIII. MOSQUITO COIL MAKING

Mosquito coils was prepared based on the industrial method of production slight alteration is done to minimize the use of industrial machineries. The ingredient used are

- Fresh leaves (Grinded)
- Pulverized dried leaves
- Starch
- Candle wax

These ingredient were mixed in same ratio and made into paste. Then the paste is coil mold. And the molded ingredient was dried under sunlight for 1 hour (depends on climatic condition).

IX. MOSQUITO COIL EFFICIENCY TEST

➤ Mosquitoes are stimulated by some factors, they are

1. CO_2 exhale,
2. Body odor,
3. Lactic acid,
4. Secretion,
5. Alcohol consumption.

The product was given to two houses (totally 8 peoples). They are suggested to use the product with 1 day interval.

Subjects are recommended,

- **Not to take shower at evening,**
- **Not allowed for alcohol consumption.**
- **Not use any room spray, and perfumes.**

The coil ash are disposed in correct manner.

Parameters to be checked:

- Replent activity
- Irritability
- Odor
- Smoke visibility
- Burning time
- Diameter
- Flexibility
- Color

X. RESULT AND DISCUSSION

Figure 2.Extraction of plant leaves

Figure 3. Phytochemical analysis

Test for	Aqueous extract
Alkaloids	-
Phenols	-
Flavonoids	+
Tannins	+
Saponins	-
Terpenes	+
Steroids	-

Table 1. Phytochemical analysis

Figure 4. Larvicidal bioassay

Statistical Analysis

Larval mortality data were subjected for calculating probit analysis in EXCEL for LC50 value for both 24 hours and 48 hours calculation. Where x axis is ppm concentration and y axis is percentage of mortality.

Figure 5. LC50 for 24 hours

$$y = 0.224x + 8$$

Since, y is 50,

$$50 = 0.224x + 8$$

$$x = (50 - 8) / 0.224$$

$$x = 187.5$$

LC50 for 24 hours is **187.5 ppm**.

Figure 6. LC50 for 48 hours

$$y = 0.304x + 6$$

Since, y is 50,

$$50 = 0.304x + 6$$

$$x = (50 - 6) / 0.304$$

$$x = 144.7$$

LC50 for 48 hours is **144.7 ppm**.

Mosquito Coil Making

Figure 7.
Pulverized leaves
(Grinded)

Figure 8. Fresh leaves

Figure 9. Coil mix

Figure 10. Molding

Figure 11. Drying coil

Figure 12. Coil Testing

TEST	HOUSE 1	HOUSE 2
Replent Activity	Good	Good
Irritability	No	No
Odor	No	No
Smoke Visibility	Moderate	Moderate
Burning time	1 h	1 h
Diameter	13cm	13cm
Flexibility	No	No
Color	green	green

Table 2. Mosquito coil efficiency test

XI. CONCLUSION

This study strongly shows *Tridax procumbens* leave has insecticidal property and larvicidal property against mosquitos. It shows that 187.5 ppm and 144.7 ppm as LC50 for 24 hrs and 48 hrs respectively. Mosquito repellent product from *Tridax procumbens* is effective and cost effective one. As it is a type of weed plant using as an insecticidal for crops is not suitable, but it is best for home pest control. The recent studies also showed *Tridax procumbens* is also effective in controlling house flies.

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