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Review Article

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Review on Herbal Insect Repellent Vaporizer Containing Tamarindus Indica Leaves, Calotropis Proceral Extract

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ABSTRACT

The ability of crude ethanol extracts from the leaves of Tamarindus indica and Calotropis procera to repel insects. This work has investigated many household insects. The leaf extract from C. procera was shown to have higher insecticidal action. The study indicates that the leaf extracts from these plants are promising candidates for use in the development of bioinsecticides, which may be less expensive and safer than synthetic pesticides when it comes to managing the population of domestic insects. In tropical developing countries, insects offer a serious problem that has led to several ailments and disorders. To either kill or repel insects, a variety of chemicals has been employed. However, they also seriously endanger human health. The insect-repelling properties of crude ethanol extracts made from Calotropis procera and Tamarindus indica leaves numerous domestic insects have been examined in this investigation. It was demonstrated that the C. procera leaf extract had a stronger insecticidal effect. According to the study, these plants' leaf extracts show promise for application in the creation of bioinsecticides, which could be safer and less costly than synthetic pesticides for controlling the number of household insects. Insects are a major issue in tropical developing nations, contributing to a variety of illnesses and conditions. To either kill or repel insects, a variety of chemicals have been employed. However, they also seriously endanger human health.

Key words: *Tamarindus indica, Calotropis procera, Bioinsecticides, Insect repellent vaporizer*

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INTRODUCTION

Serious and well-known diseases like malaria, arboviral encephalitis, dengue fever, chikungunya fever, West Nile virus, and yel-minimal fever are spread by insects. Both humans and animals suffer significant morbidity and mortality from these diseases worldwide. Insect-transmitted diseases remain a leading source of illness and death worldwide [1]. Diseases associated with viral transmission from insects to people are becoming more prevalent in tropical and subtropical regions [2]. Some of these, such as malaria and dengue, are currently the most prevalent arboviral diseases in the world. Because it includes species that can spread dangerous diseases like filariasis, Japanese encephalitis, St. Louis encephalitis, avian, and many more, the mosquito genus Cu-lex is important [3]. Free radicals and volatile organic compounds, the main culprits behind DNA and tissue damage, are present in the smoke and fumes of synthetic insect repellents. Necrosis, inflammation, apoptosis, and carcinogenesis are possible outcomes. Today, the usage of natural insecticides is necessary to address the issue of synthetic pesticides [4].

Herbal insect repellents have advantages over synthetic ones.

1. No Dangerous Substances
2. Kind to the Skin
3. Without Cruelty
4. Eco-friendly
5. Fragrant
6. Keep other bugs away
7. Mental tranquility
8. Kid-safe
9. Easily accessible and reasonably priced

Profile herbal plants that are included in the formulation

- *Calotropris procera*

Figure 1. Calotropis procera

Scientific classification of Calotropris procera
Classification
Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Asterids
Order: Gentianales
Family: Apocynaceae
Genus: *Calotropis*
Species: *procera*

Chemical constituents of Calotropris procera
Powdered leaves Cardenolides, steroids, tannins, glycosides, phenols, terpenoids, sugars, flavonoids, alkaloids, and saponins were all found in Calotropis procera leaves. Along with many glycosides, calotropin, uscharin, calotoxin, and calactin, the leaves also included a bitter substance called mudarine [5].

- *Tamarindus indica*

Figure 2. Tamarindus indica

Scientific classification of Tamarindus indica
Classification
Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Fabales
Family: Fabaceae
Sub family: Detarioideae
Tribe: Amherstieae
Genus: Tamarindus L.
Species: *indica*

Chemical constituents of Tamarindus indica
Procyanidin B2, procyanidin C2, isoquercetin, quercetin, luteolin, rutin, taxifolin, eriodyctiol, kaempferide, hydroxybenzoic acid, protocatechuic acid, protocatechuic acid methyl and ethyl esters derivatives, flavonoids, and (+)-catechin/(−)-epicatechin are among the 14 substances [6].
Liquid-based insect repellents are commonly used. Its liquidation insect repellent features graphite rods in the middle of the bottle and is filled with repellent. There is a heater in the liquidator. The repellant chemical transforms into a fume that can obstruct insects' senses when it comes into contact with the rod. The fumes released by repellents block insects' chemosensors, making it impossible for them to identify humans.
Storage: Keep out of direct sunlight in a cool, dry location in the original packaging. Avoid exposing it to temperatures higher than 50°C. **Note:** Only for external use. When not in use, doors and windows should be kept closed. Rinse your eyes well with water if it gets in them. See a physician if symptoms don't go away. Keep out of children's and pets' reach.

Excipient

Following are the different excipients which are used for the formulation [7-9].

Table 1. Excipient List

S/N	Excipient
1	Ethanol
2	Volatile oil
3	Citric acid
4	Lavender perfume
5	Ascorbic acid

Need and objectives
Need
1. With the greater awareness of hazards associated with the use of synthetic organic insecticides, there has been an urgent need to explore suitable alternative products for pest control.
2. Mosquito repellent liquid vaporizers are effective in indoor spaces with limited ventilation.
3. Herbal mosquito repellent vaporizer has fewer side effects as compared to synthetic ones.

Objective
1. To lower the number of disease cases and fatalities brought on by insect bites and mosquitoes, which carry various disease-causing vectors.
2. To create highly effective, environmentally friendly natural pesticides.
3. To prevent the negative effects of the synthetic pesticide
4. To lower the formulation's costly chemical costs

Plan of work

1. Look into the diseases associated with insects and ways to prevent or reduce them using a literature survey.
2. Look for plants that are both insect-repellent and have fewer negative impacts.
3. To isolate the extract from the natural plants, choose the appropriate extraction technique.
4. Appropriate assays to assess the extract's active components.
5. Make sure that the excipients employed in the formulation are compatible with it and do not react further with the active ingredients.
6. Formulation preparation and subsequent assessment of the formulation for product efficacy.
7. Gathering information from product evaluations on insects and reporting the findings.

MATERIALS AND METHODS

Material [10]

Table 2. Material List

S/N	Material/Chemical
1	Ethanol
2	Volatile oil
3	Herbal Extract- Calotropis procera extract Tamarind leaves extract
4	Lavender perfume
5	Ascorbic acid
6	Citric acid

Equipment

Table 3. Equipment List

S/N	Equipment
1	Soxhlet apparatus
2	Hot air oven
3	water bath
4	thermometer
5	glassware
6	measuring cylinder
7	petri dish
8	mortar pestle

Methodology identified

Collection and processing of plant samples

We gathered fresh leaves of T. indica and C. procera from the botanical gardens and a few remote locations. After being thoroughly washed, the leaves were shade-dried for five to seven days at 32 to 35°C and 50 to 60% relative humidity. Using a mortar and pestle, the dried leaves were manually ground into a powder. For further examination, the materials were kept at room temperature in a dark, airtight container.

Extraction of the herbal extract

In a Soxhlet apparatus, 90% ethanol was used to extract the dried leaves of Tamarindus indica and C. procera. The resulting residue was kept at 4°C after the extracts were concentrated at 50°C [11, 12].

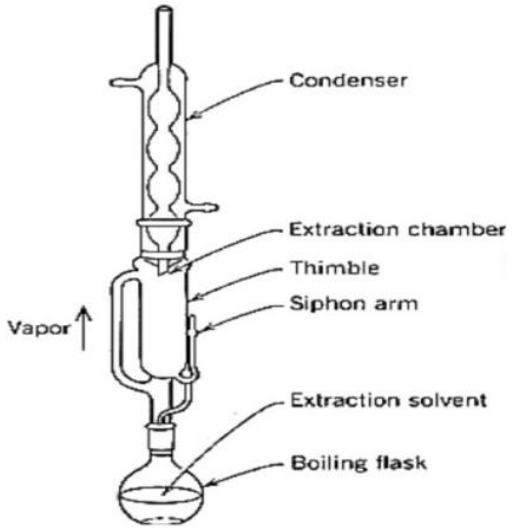


Figure 3. Soxhlet Apparatus

Phytochemical analysis of the extract

Tannins

After dissolving 20 mg of extract in 2 ml of distilled water, the mixture was filtered. After adding two milliliters of FeCl3 to the filtrate, a blue-black precipitate showed that tannins were present [13].

Alkaloids

After dissolving 20 mg of extract in 2 ml of distilled water, the mixture was filtered. After adding two to four drops of 1% HCl to the filtrate, steam was run through it. Wagner's reagent was added in six drops to one milliliter of this solution. The presence of alkaloids was indicated by a brownish-red precipitate [13].

Saponins

5 ml of distilled water was added to 0.5 ml of the filtrate that was obtained from the alkaloids test. The presence of saponins was suggested by the persistence of foam [13].

Flavonoids

After dissolving 20 mg of extract in 10 ml of ethanol, 0.5 ml of conc was filtered. Two milliliters of filtrate were mixed with HCl and magnesium ribbon. Flavonoids were present when a pink tomato-red tint developed [13].

Terpenoids

A tiny quantity of extract solution was used to conduct the Salkowski test. One milliliter of chloroform and five drops of concentrated H2SO4 were added to this mixture. Terpenoids were present when the yellow tint turned crimson [13].

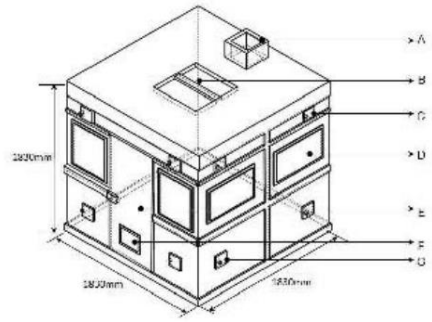
Formulation table

Table 4. Formulation Table [10, 14]

S/N	Material	Quantity
1	Ethanol	7.5ml
2	Volatile oil	0.5ml
3	Calotropis procera extract	1.5ml
4	Tamarind leaves extract	1.5ml
5	Lavender perfume	0.2ml
6	Ascorbic acid	2ml
7	Citric acid	2ml
8	Distilled water	Q.S

Evaluation of product

Evaluation of the preparation formulation using the peet-grady chamber [15].



A: Exhaust fan
B: Fluorescent light
C: Top introduction/utility window
D: Glass observation window
E: Entrance door
F: Insect introduction window
G: Bottom introduction/utility window

Figure 4. Peet Grady Chamber

Procedure

The effectiveness of household insecticides on insects is evaluated using the Peet-Grady chamber. The chamber should be housed in a suitable testing room of any manageable size, with enough extra area to enable effective test execution. The Peet-Grady chamber's interior measurements are 180 cm by 180 cm by 180 cm **(Peet Grady chember)**. Smooth interior wall panels made of glass, aluminum, stainless steel, or other appropriate materials should be utilized to make removing pesticide or solvent residues easier. One of the side walls of the apartment has a snug-fitting entrance door that measures roughly 165 by 90 cm. The chamber has an exhaust system and a fluorescent light.

RESULTS AND DISCUSSION

In the present study, the ethanol extracts of the leaves of Tamarindus indica and Calotropis procera were very successful in controlling mosquitoes, housefly larvae, and other insects that transmit vectors. Techniques for the extract's phytochemical examination. Techniques for effectively extracting herbal extracts are identified, and evaluation protocols are examined.

CONCLUSION

According to traditional usage, plant-based repellents are still widely used by rural populations in the Asian subcontinent, especially in India and Sri Lanka. This is because plants serve as a primary defense against mosquito and bug bites for a large number of the world's poorest people. Additionally, people choose repellents with a natural scent because they think that employing plants to avoid them is a safe and reliable tactic. These medicinal and fragrant plants can be used to make a variety of medications, but they can also be used to make other high-value goods for the Indian market. Using these ingredients, we can make a mosquito repellent vaporizer.

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