



## Formulation and Evaluation of Herbal Liquid Mosquito Repellent

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### ABSTRACT:

In this project work discuss about Ghaneri, ghaneri is often called 'kamoni' it is especially known as mosquito repellent and keep disease spread by mosquito at bay. It can also help deals with other medical issue like pain relief ,biocidal activity, fungicidal, insecticidal .There are so many diseases which are spread by mosquitos and for their control aspects there are numbers of commercially products which are available. To overcome the harmful effects of available mosquito repellent formulation. Herbal formulations can help in developing ecofriendly and cheaper alternatives. With this view in mind lantana camara leaf extract was utilized to make liquid mosquito repellent and used to evaluate mosquito repellence by smoke toxicity test and compared with commercial product. The test reveled that the control could show that the control ( commercial product) 100% mortality in 30 min. It creat some side effect like headache , watery eyes, coughing in some member. the presence of different phytochemicals in different solvent extract corborates the insecticidal activity. Antibacterial activity is also found against three test organism . this result may be used for conformation and development of drug Medicinal plant have been utilized by people for their therapeutic benefits from the beginning of human existence. For thousand of years, environment the has been the source of the medicinal component , and a significance proportional of contemporary medications have been identified from nature. Ghaneri is a popular herbaceous shrub in India. The discovery of active modules from plants and their biological function in disease regulator has recently sparked widespread interest in plants.

**Keywords:** Lantana camara , Verbenaceae , Antioxidant, Anti inflammatory, Mosquito larvicidal, antibacterial , etc.

### Introduction

#### Mosquito-

Mosquitos may be small and have short lifespans, but they can wreak havoc on human lives. From their itchy bites to the diseases they can carry, mosquitos are often annoying and sometimes deadly. Mosquitos are members of the fly family. They're big enough that most people can easily see them with the naked eye.

#### Mosquito repellent-

A Mosquito repellent is a substance designed to keep away mosquitoes, thereby preventing them from biting humans and feeding on human blood. It typically contains an active ingredient that repels mosquitoes and secondary ingredients that, among other things, dilute the active ingredient to desired concentration and help in releasing the active ingredients when needed.

The product that are currently available in the market is in the form of followings:

1. Mosquito coils
2. Liquid repellent
3. Creams, Lotions, oils
4. Spray

**Liquid repellents** are now widely used to repel mosquitoes. The Liquidator mosquito repellent has a graphite rod in the middle and the bottle is filled with the repellent. There is a heater coil in the liquidator. The repellent chemical when comes in contact with the heated rod turns into fume which attack the nervous systems of mosquitoes.

This mosquito repellent consists of a liquid mix, that gels converted into vapours on moderate heating.

- Insecticide- this makes the mosquitoes to fly away.

- Stabilizer/ anti- oxidant- to prevent the insecticide getting oxidized due to heat.
- A perfume- to prevent the humans from running away.

Lantana Camara is a flowering ornamental plant. It is used in several traditional medicinal preparations and is well known to cure several diseases. It is a major source of various classes of bioactive natural metabolites. From ancient times, flowers are used as pectoral for children, leaves, and fruits of that plant can be used externally in various skin diseases, cuts, and wounds. Stems and roots are used for gargles and toothaches as a toothbrush. The present article is reviewed that the phytochemical, analytical, pharmacological activities, and toxicology of *L. camara* Linn .

#### Synonyms:

Marathi	Ghaneri ,Tantani
Hindi	Raimuniya
English	spanish flag ,Wild sage
Tamil	Unnichi
Kannada	Kakke , natahu
Telugu	Pulikampa
Manipur	Samballei, Nongballei
German	Wandelrosehen

different vernacular names of *Lantana camara*

#### Biological Source:

It is a flowering ornamental plant of *L.camara* Linn. belonging to the family **Verbenaceae**.

#### Taxonomy :

Kingdom	Plantae
Sub kingdom	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnolopsida
Subclass	Asteridae
Order	Lamiales
Family	Verbenaceae
Genus	<i>Lantana</i>
Species	<i>Lantana camara</i>

Taxonomy of *Lantana Camara*

#### Geographical Source :

The Wild sage is found in many states in India such as Jammu-Kashmir, South India, and Tamil Nadu, in different parts of Maharashtra, and also in Himachal Pradesh and Uttar-Pradesh. It is found in the Caribbean and Central and northern South America also now dispersed in about 60 tropical and subtropical countries and also temperate parts of the world.

#### Plant Description :

*L. camara* is a low erect or sub scandent vigorous shrub with a tetragonal stem, a strong odor of black currants, and stout recurved pickles. The plant is found up to height 1 to 3 m and width of 2.5 m. Images of plants, flowers, fruits, front, and dorsal view in following figures.

#### Leaves :

Leaves are ovate or ovate-oblong, crenate serrate, acute or sub acute, rugose above, and scabrid on both sides. The leaves are averagely 3–8 cm long and 3–6 cm wide and have a green color. Leaves and stems are roofed with rough hairs. Leaves are the main source of phosphorous and potassium

when used as a green mulch. Inflorescence Pairs in the axils of opposite leaves inflorescences are produced, which are compact, dome-shaped 2–3 cm across, and contain 20–40 sessile flowers.



Leaves and flowers of *Lantana camara*

#### Flowers :

Flowers of *L. camara* are small habitually yellow or orange altering to red or scarlet, in dense axillary heads. The calyx is small, corolla tube slender, the limb spreading 6–7 mm wide and divided into unequal lobes. Stamen is four in two pairs, which included ovary two ovules, two-celled. Flowering arises between August and March, or all-around year if suitable moisture and light are available and small flowers are held in clusters. Color is usually orange, sometimes varying from white to red in various shades and the flowers usually change colors as they age. In the axillary head, flowers are having a yellow throat almost throughout the year.

#### Fruits:

The ripe fruits are heavily consumed by birds and frequently eaten by humans in some countries

#### Roots:

The root system of this plant is very strong and even after repeated cuttings; it gives out new fresh shoots.

#### Ecology :

*Lantana camara* is collected from an area that has about 250 mm to 2900 mm of rainfall; it grows on all types of well-drained soil. It tolerates salt spray and keeps out in a dry period very well. Aerial portions of the plant are killed by temperatures of  $-2^{\circ}\text{C}$  but quickly grow back. It is colonizing disturbed areas because they are an intolerant pioneer. The species of that plant occur in varied habitats at open unshaded regions which include forests, rainforest edges, wastelands, beach fronts, and spread by activities such as logging or fire. The species also grow well in disturbed areas which include beach areas, roadside, railway tracks.

#### Traditional uses :

*L. camara* is used as a garden decorative plant while in some countries it is implanted as a border to keep out animals. It has many more therapeutic uses, mostly as herbal medicine.. *Lantana* oil is used in the treatment of wounds as antiseptic, skin itches, and also reported in the treatment externally for scabies and leprosy .

This plant is used as carminative, diaphoretic, tonic, antispasmodic, antiemetic, respiratory disorders (bronchitis, asthma, cold, and cough) and to treat respiratory infections also in the treatment of gastropathy, epilepsy, tetanus, and dysentery, antitumor activities, immune-suppressive, and anti-microbial. The fruits are used in rheumatism, fistula, tumors, and pustules. The roots are used in rheumatism, malarial, dermatitis, skin rashes, eczema, respiratory tract infections including, tuberculosis and influenza, and mycotic infections .

#### Potential uses:

It is a major liquid source for various species of moths and butterflies. It can be also used for the prevention of erosion and soil compaction. Organic substances of this plant are used for grassland renovation. In Australia, the nursery sector is a brilliant source of income as an ornamental plant. The roots containing substances of the plant are sometimes used in the rubber industry.

The plant has been used for biogas production mixed with cow dung and the seeds have additional nutritive value when feeding with wheat straw to sheep. It is used in some household furniture such as chairs and tables are made from the stems, or the small branches are bundled together to make brooms and sometimes used as mulch and firewood .

#### Phytochemical constituents :

Parts of *L. camara* such as leaf, stem, and roots contained flavonoids, alkaloids, tannin, protein, catechin, phenol, saponin, steroids, anthraquinone, reducing sugar, and several tri-terpenoids which contain various important phyto molecules such as verbascoside, linarioside, lanatoside, umuhengerin, ursolic acid, carminic acid, caprylic acid, and phytol. These are mostly responsible for using various biological activities .

The elements of essential oil of *Lantana* are *sabiene*,  $\beta$ -caryophyllene,  $\alpha$ -humulene, 1,8- cineole and 8-hydroxy bicycle germacrene, caryophyllene, 1,8-cineol, two rare sesqui-terpenoid humulene epoxide-III, and sabinene . Chemical investigation of the flower and leaves extract to give knowledge of similar lipid and carbohydrate compositions.

#### Essential oil:

Sr. no.	Oil Extract	Essential oil
1.	Flower oil	Thymol (32.3% ), $\beta$ -caryophyllene (13.5%), $\alpha$ -humulene (6.4%), sabinene (15.6%), $\beta$ -phellendrene (7.1%), germacrene D (6.6%).
2.	Fruit oil	Beta-caryophyllenen (25%), $\alpha$ - humulene (12%), limonene (16%), beta-farnesene (5.5%), bicyclogermacrene (6.2%), cadinol (5.0%).
3.	Leaf oil	Beta-caryophyllene (40.8%), $\alpha$ - humulene (21.2%), sabinene (9.0%), Bicyclogermacrene (7.9%), $\alpha$ - pinene (4.4%), Linalol (0.4-1.9%).

Contents in the extract of *Lantana camara*

#### Pharmacological activities :

- i. Antioxidant activity
- ii. Antimicrobial activity
- iii. Antibacterial activity
- iv. Antifungal activity
- v. Antiulcerogenic activity
- vi. Mosquito larvicidal activity
- vii. Anthelmintic activity
- viii. Anti-hyperglycemic activity
- ix. Wound-healing activity

Anti-inflammatory and analgesic effect

#### Experimental:-

- 1) **Selection of pure drug :** Leaves of *Lantana camara* linn. Was collected from the rural area nearby Chh. Sambhajinagar. After collection leaves was properly washed by tape water later dry under shade . later powder was obtained from well dry leaves.
- 2) **Preparation of reagent :** In this project, distilled water , ethanol, chloroform used as a solvent. Distilled water was prepared in laboratory by using soxhlet apparatus. Tape water was taken in round bottom flask . later it was put on the soxhlet extraction . After 30 min.- 1 hr. distilled water was collected from process

Formulation no. 01 :

Method of preparation:

20 gm of fresh kamoni leaves was taken in cork bottle

|

100 ml of ethanol was added into it

|

Kept on maceration, for 7 days

|

Method of Extration : macerated sample was extracted through soxhlet apparatus , apparatus was arranged on heating mantle

|

Extraction was carried out for 30 min. at 40 degree celcius temperature.

|

Later, extract was collected

Formulation no. 02:

Method of preparation :

20 gm powder of dry Ghaneri leaves was taken in corked bottle

|

100ml of ethanol was added into it .

|

Sample was kept for maceration upto 7 days

|

Method of extraction : macerated sample was extracted through soxhlet apparatus , apparatus was arranged on heating mantle

|

Extraction was carried out for 30 min. at 40 degree celcius temperature.

|

Later, extract was collected

Formulation no. 03:

Method of preparation :

18 gm powder of dry Ghaneri leaves was taken in corked bottle

|

100ml of chloroform was added into it .

|

Sample was kept for maceration upto 7 days

|

Method of extraction : macerated sample was extracted through soxhlet apparatus , apparatus was arranged on heating mantle

|

Extraction was carried out for 30 min. at 40 degree celcius temperature.

|

Later, extract was collected

Formulation no.04 :

Method of preparation :

20 gm powder of dry Ghaneri leaves was taken in corked bottle

|

200ml of distilled water was added into it .

|

Sample was kept undisturbed for 24 hours

|

Method of extraction

Extract was obtained with the help of whhattman filter paper no 1

|

Later extract was collected

**PLANT PROFILE:-**

Scientific Name :

*Lantana camara* Linn.

Synonym :

*L. aculeata* L.; *Camara vulgaris* Benth.; *Lantana armata* Schauer; *Lantana*

Common Names:

Lantana, tick berry, Spanish flag, magwagwa (Luo), mjungwina (Shambaa), mukenia (Kikuyu), nyabend-winy (Luo), omuhuuki (Ankole)

Family: Verbenaceae

Naturalised distribution (global):

Locations within which *Lantana camara* is naturalised include Africa, Australia, India, south-eastern Asia and many oceanic islands with warm climates. *Lantana camara* is invasive in large parts of Kenya, Tanzania and Uganda (Lyons and Miller 1999). It is very widespread in all three countries.

Habitat:

*Lantana camara* occurs along roadsides, in degraded lands, in [riparian](#) zones (banks of watercourses), along fence lines and in pastures and parklands, in plantations, forest edges and gaps and is now seen invading native vegetation in woodlands and [savannas](#) (notably in protected areas).

**MATERIALS AND METHODS:**

Sr. No.	Particular	Quantity
1.	Dry Kamoni leaves	20 gm
2.	Distilled water	200ml
3.	Ethanol	100ml
4.	Chloroform	100ml
5.	Ferric chloride	2-3 gm
6.	Lead acetate	2-3 gm
7.	Sulphuric acid	1-3 ml
8.	Mayer's reagent	2-3 ml

Materials used in experiment

Drugs and chemicals:

Dry Ghaneri leaf powder, chloroform, ethanol, distilled water, lead acetate, ferric chloride, sulphuric acid

Glassware's and instruments:

Heating mantel, beaker, stirrer, funnel, round bottom flask, measuring cylinder, soxhlet apparatus.

Identification test :

- Detection of Alkaloids:
  - Mayer's test: The extract was treated with Mayer's reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.
  - Wagner's test: The extract was treated with Wagner's reagent. Formation of brown/reddish brown precipitate indicates the presence of alkaloids.
- Detection of Flavonoids:
  - Lead acetate test: Extracts were treated with few drops of lead acetate solution. Formation of yellow color precipitate indicates the presence of flavonoids.
  - Sulphuric acid test: Extracts were treated with few drops of H<sub>2</sub>SO<sub>4</sub>. Formation of orange colour indicates the presence of flavonoids.
- Detection of Tannins: A small quantity of extract was mixed with water and heated on a water bath. The mixture was filtered and ferric chloride was added to the filtrate. A dark green colour was formed. It indicates the presence of tannins.

- Detection of Carbohydrates: 0.5ml extracts were dissolved individually in five ml distilled water and filtered. The filtrate was used to test the presence of carbohydrates.
- Detection of Protein & Amino acids
- Biuret test: To 0.5 ml of extract equal volume of 40% NaOH solution and two drops of one percent copper sulphate solution was added. The appearance of violet colour indicates the presence of protein.
- Ninhydrin test: About 0.5 ml of extract was taken and two drops of freshly prepared 0.2% Ninhydrin reagent was added and heated. The appearance of pink or purple colour indicates that the presence of proteins

Sr. No.	Physical properties and test	Description
1.	Physical state	Liquid
2.	Color	Dark green
3.	Odor	Hard to explain
4.	Detection of Phenols : a. Ferric chloride test – b .Lead acetate test-	Positive Positive
5.	Detection of flavonoids: Lead acetate test- b. Sulphuric acid test-	Positive Positive
6.	Detection of Terpenoids : a. salkowski test-	Positive
7.	Detection of Tannins	Positive

Different identification test of *lantana camara* extract

Evaluation test :

The authenticated test for the evaluation of liquid mosquito repellent is smoke toxicity test :

Date :	Time of exposure	Average kill
29/ 11/23	1:30 hr.	2-3
30/11/23	1:30 hr.	5-6
01/12/23	1:30 hr.	4-5
02/12/23	1:30 hr.	3-5

Smoke toxicity test

## Conclusion :

In conclusion, the formulation and evaluation of herbal liquid mosquito repellent present a promising avenue for developing effective and environmentally friendly alternatives. The use of herbal ingredients not only demonstrates potential repellent properties but also aligns with the growing demand for natural and sustainable mosquito control solutions.

Further research and testing are essential to refine formulations and ensure the product's efficacy and safety for widespread use.

The exploration of herbal liquid mosquito repellents signifies a progressive shift toward sustainable and nature-inspired solutions in pest control. The incorporation of herbal ingredients not only holds promise for effective mosquito repellency but also reflects a broader societal inclination toward eco-friendly alternatives.

The formulation process, coupled with rigorous evaluation, underscores the necessity for scientific validation and optimization to ensure both efficacy and safety. This endeavor signifies a pivotal step in addressing public health concerns while aligning with the global movement toward sustainable and environmentally conscious practices in product development. Continued research, innovation, and collaboration are imperative to harness the full potential of herbal liquid mosquito repellents and foster a paradigm shift in mosquito control methodologies.

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