

Study of *Cymbopogon Citratus* (Lemon grass) Application for its Insecticidal Property – ‘Ants’ and its Use in Preservation Methodology

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Abstract: *Cymbopogon citratus* (Lemon grass) is a widely used herb in tropical countries, especially in Southeast Asia (Shah., Gagan. *et.al*). The plant aerial part is specially known for its extensive properties of volatile oil. The aerial part and the essential oil extracted has wide range of its utilization in aromatherapy, antibacterial, antifungal and insecticidal property. *Cymbopogon citratus* aerial parts boiled with garlic and ginger paste is used in various food as a flavouring agent. Based on the consideration of a property with wide array of its use for edibility purposes and diverse concept of its specificity due to a presence of the constituents; an experimental research study is focused upon its application on ‘Ants’ as insect repellent and its use in preservation methodology which may form a substitute in terms of its natural ingredients. The experimental work carried on confectionery product ‘Candy’ concludes desired effect along with a way for its use in preservation technique.

Keywords: *Cymbopogon citratus*, Insect repellent, preservation methodology

1. Introduction

Cymbopogon citratus, (Lemon grass) is a widely used herb in tropical countries, especially in Southeast Asia. (Shah, Gagan. *et.al*). The genus *Cymbopogon* is the member of a family - Graminae; which are herbs known worldwide for their high essential oil content. They are widely distributed across all continents where they are used for various purposes. The leaves of Lemongrass (*Cymbopogon citratus*) contains lemony characteristic flavour due to its main content, citral which present great importance to the industry. (M.A.Suryawanshi and V.B.Mane, *et.al*). The commercial and medicinal uses of the various species of *Cymbopogon* are well documented. (Opeyemi Avoseh., Opeoluwa Oyedeji *et.al*). The chemical composition of oil was analyzed by gas chromatography (GC)/mass spectrometry (MS) and fifteen components were identified, where neral (39.0%), geraniol (33.3%), limonene (5.8%) and geranyl acetate (4.2) were the most abundant constituents. (Mahdi Vazirian, Somayeh Taheri Kashani *et.al*). Citral is a starting material for the preparation of ionones. α -ionone is used in flavours, cosmetics and perfumes. While; study says that Citronellal constituent is found effective as mosquito repellent. The economic burdens and health implications of food spoilage are increasing. Contamination of food sources by fungi, bacteria, yeast, nematodes, insects, and rodents remains a major public health concern. (Christopher E., Ekpenyong & Ernest E. Akpan).

Hence a desired solution needed against insects for the protection and its use in preservation of confectionery product. Since, a high geraniol, citral and citronellal content; *Cymbopogon citratus* (lemon grass) suits best for analyzing the solution.

The research study aims on a study of lemon grass leaves mixed with garlic paste solution as ant’s repellent by applying it on confectionery product; candy with further application of it on preservation methodology. The desired results obtained were based on the parameter followed during experimental work.

2. Materials and Methods

Fresh Lemon grass leaves and Garlic were bought from local market. 100 grams of *Cymbopogon citratus* (lemon grass) fresh leaves was washed thoroughly and boiled in sterile water. The solution heated for 20 minutes after boiling process initiated. In other container; 1 gram of garlic was peeled off and crushed thoroughly. Per 100 grams of boiled solution 1 gram of crushed garlic was added. The solution was mixed properly; cooled and filtered. The filtrates; each of different concentrations was poured into a sterilized spraying chamber. Distilled water was utilized to dilute the solution of *Cymbopogon citratus*. While garlic concentration was kept same until all dilution. The filtrates were tested on the samples of candy. Amongst all samples an untreated one was considered as Control.

The number of samples tested; based on considered concentrations followed in a set of triplet is as given below.

Table 1.1

Sample	Concentration Garlic : Leaves solution (1ml :100ml)
1	Control
2	1:500
3	1:400
4	1:300
5	1:200
6	1:100

Candies bought from local store were unwrapped. The solution of different concentration was sprayed on candies and kept in open space for 30 minutes under observation to study the effect of it as insect repellent property.

3. Results and Discussion

The number of ants (insect) observed is given below in tabular form

Table 1.2

Sample	Concentration Garlic: Leaves solution (1ml :100ml)	Number of Ants
1	Control	24
2	1:500	12
3	1:400	09
4	1:300	05
5	1:200	02
6	1:100	00

All samples treated with different concentrations showed varied results. The control was found to be the most affected candy by ants. Increase in a dilution of solution showed increase in the number of ants. The graphical presentation of table 1.2 is given in **fig 2.1**

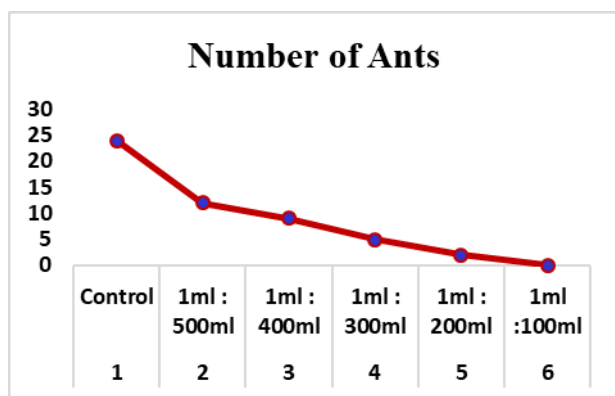


Figure 2.1

The control sample showed highest number of insect viz. 24 ants. Sample of 1ml:500ml concentration when sprayed on candy showed 12 ants which is lesser as compared to the control sample ; viz. 1ml:500ml < Control

While 1ml:400ml concentration showed 09 ants. This specifies the insect attracted towards the candy of control sample but effective than that of the concentration of 1ml:500ml and control. Thus, it may be presented as 1ml:400ml < 1ml:500ml < Control.

The sample of 1ml: 300ml concentration showed effective result of 5 ants. This was found more effective than the concentration considered at 1ml : 400ml, 1ml : 500ml and the Control. Viz. 1ml:300ml < 1ml:400ml < 1ml:500ml < Control.

1ml: 200ml concentration showed 2 ants the least number observed amongst all above mentioned concentration other than 1ml:100ml concentration. Thus, insect repellent activity was found better in this concentration.

The efficiency of 1ml: 100ml concentration was found to be the best; when compared to all other concentrations; since “Null” number of ants were observed on candy.

Based on all above results observed during experimental study the parameter of 1ml: 100ml is suited to be a practically applied insecticide as it repelled 100% ants. Thus presented as 1ml:100ml < 1ml:200ml < 1ml:300ml < 1ml:400ml < 1ml:500ml < Control.

4. Conclusion

The insect repellent property observed during study simply proves the presence of active constituents in *Cymbopogon citratus*.

The activity studied holds a proving ability in terms of preservation of confectionery product-‘candy’ by repelling insect-ants in an open space when unwrapped for a specified time. This research study also creates a way for higher precise thorough future experimentations in terms of insect repellent property –Ants; in-order to standardize the parameter of *Cymbopogon citratus* solution with various mixtures of garlic along with its effect to make it specific in terms of consumption from edibility point of view

The research clearly edifies the property of insect repellent; on confectionery product - candy along with its usefulness in preservation technique.

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