



Scienxt Journal of Pharmaceutical Sciences
Vol-1 || Issue-1 || Year-2023 || Jan-June || Pg:33-42

Formulation and evaluation of polyherbal ant-repellent spray

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Abstract:

The ants are the most dominant group of social insects belonging to order Hymenoptera of class Insecta and family Formicidae. Ants can contaminate and destroy some agricultural products and stored foods. They get attracted towards sweet, food and play role as a scavenger. Ant invasions are the bane of homeowners. They can devastate plants and take over kitchens. Poisons and chemicals are effective, but dangerous in the kitchen. Essential oils belonging to various plant species and possessing mixtures of hydrocarbons have been seen to act as effective repellent against various pests. The easy availability, less adverse environmental impact and to eliminate toxic effects occurring due to repeated use of synthetic chemical insecticides have led to the increased interest in plant origin insecticides as an alternative to chemical insecticides. In the present study polyherbal Ant repellent is formulated which basically consist of essential oils from plants Eucalyptus globules, Eugenia caryophyllus, Mentha piperita, Alium sativum, Curcumis sativus & Citrus limonum. Experiments were carried out to evaluate the repellent property of plant extracts.

Keywords:



Ant Repellent, polyherbal, essential oil, plant extracts.




1. Introduction:

Arthropod bites remain a major cause of patient morbidity. These bites can cause local or systemic effects that may be infectious or inflammatory in nature. To kill Ants by using synthetic insecticides will be harmful to nature and poisonous to man and pet animals. The insecticidal properties of number of plants have been discovered long ago. Botanical plant extracts are environmentally less harmful than synthetic pesticides to control pests. They possess one or more useful properties such as biodegradability, broad spectrum of activity & ability to reduce insect resistance. Synergistic effect due to mixing of different plant species plays a key role to control pests. High cost of chemical insecticide leads to search alternative source for pest management.

The optimal management of arthropod bites is prevention, and many over-the-counter insect repellents are available. Since first marketed in 1956, DEET (N,N-Diethyl-meta-toluamide, also called diethyl toluamide) has remained the most effective repellent against mosquitoes, biting fleas, gnats, and chiggers. The risk of serious side effects with the use of DEET is slight; nevertheless, the lowest effective concentration should be used. Therefore, objective of this study is to control these ants by using bio rational control methods.

Table.1: List of natural ingredients used

S.No.	Herbal Ingredients	Biological Source	Family	Chemical Constituent
1	Eucalyptus Oil: 	Eucalyptus oil is essential oil obtained by the distillation of fresh leaves of Eucalyptus globules	Myrtaceae	1, 8-cineol (49.07 to 83.59%) and a-pinene (1. 27 to 26.35%).
2	Garlic: 	Garlic is the ripe bulb of Allium sativum	Liliaceae.	S-propyl-cysteine-sulfoxide (PCSO), allicinandS-methylcysteine-sulfoxide (MCSO).
3	Turmeric	Turmeric is a productof rhizomatous		Cyvlocurcumin and curcumin

		herbaceous perennial plant <i>Curcuma longa</i>	Zingiberaceae.	
4	Clove 	Cloves consist of dried flower buds of <i>Eugenia caryophyllus</i> .	Myrtaceae	Eugenol, cariofileno, alpha-humulen.
5	Mint: 	Mint consist of dried leaves and flowering tops of <i>Menths piperita</i> (peppermint) and <i>M.spicata L.</i> (spearmint).	Lamiaceae.	Menthol, Menthone, (+/-)-menthyl acetate, 1,8 -cineole, limonene, beta - pinene and beta-caryophyllene.

2. Method of Extraction:

2.1. Eucalyptus Oil:

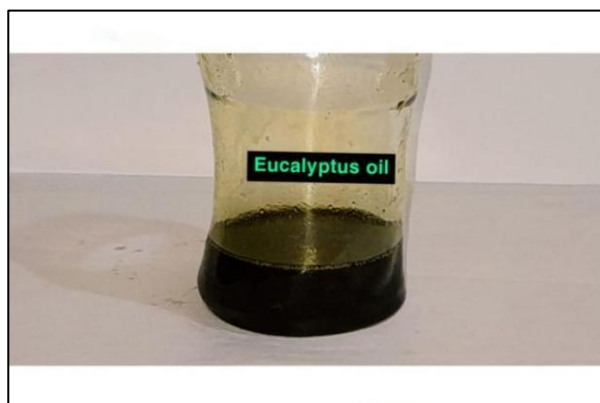


Figure.1: Eucalyptus oil extracts

Around 60 grams of fresh eucalyptus leaves were mixed with 60 ml of castor oil, followed by a thin layer of sea salt. Which would helped the extract the oil. With the handle part of a long spoon, eucalyptus was smashed into the bottom of the jar, releasing their natural oils.

2.2. Clove Oil:



Figure.2: Clove oil extracts

About 8 grams of whole cloves were placed on a bowl after crushing, and around 15ml of coconut oil was added to help in release of the essence from the cloves.

2.3. Cinnamon Oil:



Figure.3: Cinnamon oil extracts

Extraction of the cinnamon essential oil was carried out by steam distillation method, which took 3-4 hours for completion.

2.4. Garlic Oil:

Some peeled garlic cloves were taken in a pot, and covered with olive oil. The mixture was heated over low heat until the cloves were tender and more muted in flavour, and were pressed to extract the oil.



Figure.4: Garlic oil extracts

2.5. Bay leaf oil:



Figure.5: Bay leaf oil extracts

10-12 leaves were washed and dried and kept submerged in coconut oil in a container. It was stored for 3 days, and strained.

2.6. Peppermint Oil:



Figure.6: Peppermint oil extracts

Fresh Peppermint leaves were washed and chopped into fine pieces. Then the mint leaves were stuffed in a jar filled with alcohol. The jar was kept as such for 20 days

2.7. Formulation for ant repellent spray:

Table.2: Quantities used for the preparation

S. No.	Ingredients	Quantity
1	Eucalyptus oil	20 ml
2	Clove oil	12 ml
3	Cinnamon oil	20 ml
4	Garlic oil	8 ml
5	Bay leaf oil	20 ml
6	Peppermint oil	20 ml

3. Evaluation:

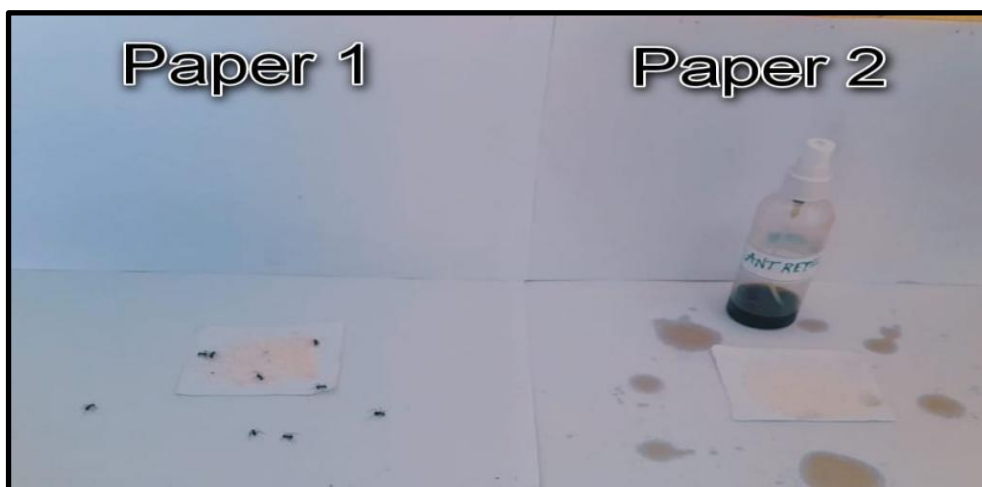


Figure.7: Result shown after the use

3.1. Procedure:

1. Equal amount of sugar was placed on two equal paper.
2. Paper 1 was not sprayed whereas paper 2 was sprayed by poly herbal ant repellent spray.
3. Sugar was left for an hour for the arrival of ants.
4. Ants was observed on paper 1 which was not sprayed whereas in paper 2 there was no ants.

4. Result:

All herbal extracts selected for the studies were reported to show repellent activity in ants. In this project, it is observed that, selective household substances, cinnamon oil garlic oil repelled ants more safely and effectively for longer duration.

5. Conclusion:

In conclusion, we have demonstrated that garlic oil. Clove oil and cinnamon oil, which are non-toxic household products, are effective in repelling ants. The results of this study could be used to create eco-friendly, non-toxic, and relatively inexpensive ant repellents. Future investigations could also unravel ant odor receptor biology. Our findings add to the growing body of evidence that the invasion of various pests can be controlled by household products that do not carry the attendant harmful effects of commercial pest control chemicals.

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