

CONTROL OF HOUSE HOLD ANTS USING BOTANICAL EXTRACTS

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The present study focused on developing effective ant control from herbal plant extracts. As a group ants are most difficult house hold pests to control. Often, application of chemicals is the most commonly used control measure with harmful effect on the environments and non-target organisms. Therefore, objective of this study is to control these ants by using botanical control methods. Hence laboratory assays were carried out to evaluate the ant control property of plant extracts of six indigenous native botanicals namely Garlic, Ginger, Turmeric, Neem, Tulasi, and Mint against ant. The extracts were prepared by grinding with water. *Solenopsis geminate*, *Camponotus compressus* are the two species of ants used in this study. The aqueous extracts were treated against 20 ants at dose levels of 1%, 3%, 5%. standard checks (α Cypermethrin (1%) controls were used for comparison. Observations were made at 48 hours. Highest % mortality was recorded in garlic. The minimum % mortality was shown by ginger, neem extracts. As the dose and time increases, the mortality effect also increased. The use of such plant extracts can control the different households in an eco-friendly way.

Keywords: Botanical Extracts, Mortality, *Solenopsis geminate*, *Camponotus compressus*.

Ants are the most prominent group among social insects. The economic importance of ants clearly evident from the fact that they do both beneficial role and harmful role to man. Ant is acting as pests and it inhabit in home and structures primarily because of food water and favourable nesting site available there. Ants can contaminate and destroy some agricultural products and stored foods. They get attracted towards food and play role as a scavenger. Poisons and chemicals are effective, but dangerous in the kitchen. To kill them 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 (Chaudhari et al., 2013) But in the use of chemical insecticides cause health hazards in human beings and other organisms. In such situation botanical insecticides are effective to kill and repel house hold ants. Therefore, objective of this study is to control these ants by using botanical control methods. Hence laboratory assays were carried out to evaluate the repellent and killing property of plant extracts of six botanicals Garlic, Ginger, Turmeric, Neem, Tulasi and Mint against ant.

Materials and Methods

Two different types of house hold ants were collected alive by using various trap methods. Honey and sugar were used to trap. Various dilutions of all extracts were prepared by using distilled water as a solvent. The extracts of Garlic, Ginger, Turmeric, Neem, Tulasi and Mint were prepared by grinding with water. To evaluate the effect of botanical extracts, the test organisms were released into glass bottles. Glass bottle has sufficient diameter. After this bottles are sprayed with extract of required concentration by using a hand sprayer. The aqueous extracts were treated individually against 20 ants at dose levels of 1%, 3%,

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and 5%. Care should be taken to spray an equal amount of Botanical extract on each glass bottle; otherwise may result leading to early death of test insect. For each botanical extracts control, sugar and with commercial an insecticide α Cypermethrin (1%) were maintained with insects without any contamination of botanical extracts (Addisu et al.). For each insecticide 3 replica plates of twenty

Results and Discussion

Data of % Mortality values of herbal plant extracts of Turmeric, garlic, Neem, Ginger, Tulasi, mint, in concentration 1%, 3%, 5% at 24 and 48 hours were analysed. Maximum percentage mortality (100%) of the *Solenopsis geminata* and *Camponotus compressus* were registered from the

Botanical Extracts	Mean %Mortality over time(hr.) $\pm$ SD			
	24		48	
	<i>Solenopsis geminata</i>	<i>Camponotus compressus</i>	<i>Solenopsis geminata</i>	<i>Camponotus compressus</i>
Turmeric (1%)	35 $\pm$ 1	28.33 $\pm$ 0.5	58.33 $\pm$ 1.5	53.33 $\pm$ 0.5
Turmeric (3%)	48.33 $\pm$ 1.5	61.67 $\pm$ 0.5	73.33 $\pm$ 0.5	80 $\pm$ 2
Turmeric (5%)	68.33 $\pm$ 1.1	76.67 $\pm$ 1.5	88.33 $\pm$ 0.5	93.33 $\pm$ 1
Garlic (1%)	33.33 $\pm$ 0.5	46.67 $\pm$ 1.1	48.33 $\pm$ 2	61.67 $\pm$ 1.5
Garlic (3%)	51.67 $\pm$ 1.5	58.33 $\pm$ 1.1	68.33 $\pm$ 0.5	76.67 $\pm$ 1.5
Garlic (5%)	66.66 $\pm$ 1.1	71.67 $\pm$ 2.5	95 $\pm$ 1	100 $\pm$ 0
Neem (1%)	26.67 $\pm$ 1.5	23.33 $\pm$ 0.5	43.33 $\pm$ 1.5	46.67 $\pm$ 1.5
Neem (3%)	38.33 $\pm$ 1.5	40 $\pm$ 2	63.33 $\pm$ 1.1	58.33 $\pm$ 1.5
Neem (5%)	56.67 $\pm$ 2.5	60 $\pm$ 1.7	78.33 $\pm$ 1.5	80 $\pm$ 0
Ginger (1%)	21.67 $\pm$ 0.5	25 $\pm$ 1.7	40 $\pm$ 1.5	43.33 $\pm$ 0.5
Ginger (3%)	36.67 $\pm$ 2	33.33 $\pm$ 0.5	58.33 $\pm$ 2	58.33 $\pm$ 1.5
Ginger (5%)	48.33 $\pm$ 1.5	56.67 $\pm$ 1.5	71.67 $\pm$ 1.1	75 $\pm$ 1
Tulasi (1%)	26.67 $\pm$ 1.1	28.33 $\pm$ 1.5	41.67 $\pm$ 1.5	46.67 $\pm$ 2
Tulasi (3%)	33.33 $\pm$ 2	40 $\pm$ 1.7	55 $\pm$ 0	61.67 $\pm$ 0.5
Tulasi (5%)	51.67 $\pm$ 1	46.67 $\pm$ 1.5	76.67 $\pm$ 0.5	78.67 $\pm$ 1.7
Mint (1%)	38.33 $\pm$ 0.5	35 $\pm$ 2	48.33 $\pm$ 1.5	45 $\pm$ 1
Mint (3%)	53.33 $\pm$ 2	51.67 $\pm$ 1.5	61.67 $\pm$ 0.5	68.33 $\pm$ 1.5
Mint (5%)	66.67 $\pm$ 1.5	61.67 $\pm$ 1.1	90 $\pm$ 1.5	88.33 $\pm$ 1.1
Sugar	00	00	00	00
Control	00	00	00	00
α Cypermethrin (1%)	100	100	100	100

Table.1 Percentage mortality (%) of Ants due to water extracts of Botanical Extracts at different concentration over time.

insects were maintained. Observation on mortality of the ant was recorded after 24 hour and 48 hour of continuous exposure. The dead ants in three replicates were combined and expressed as percentage of ant mortality for each concentration. From the data obtained Mean % mortality based on both 24 and 48 hour observations was calculated. Standard deviations were calculated for three replicates.

positive control (α Cypermethrin) followed by and non-significantly different from Garlic with *Solenopsis geminate* 66.7% , 95% and with *Camponotus compressus* 71.7% , 100% at 5% concentration 24 and 48 hr. after exposure, respectively (Table.1). Minimum percentage mortality was registered from ginger with *Solenopsis geminate* 48.3%, 71.7% and with *Camponotus compressus* 56.7%, 75 at 5%

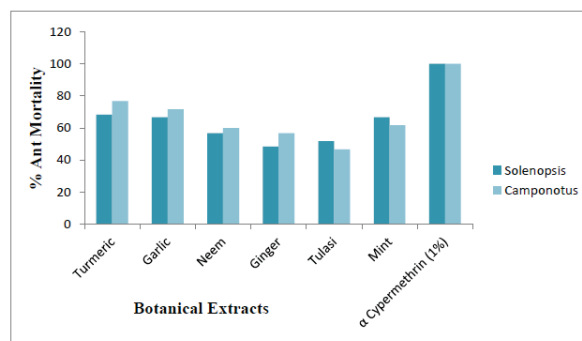


Fig.1 Percentage Mortality of Botanical Extracts At 28hr. Against *Solenopsis geminata* and *Camponotus compressus*

concentration 24 and 48hr. respectively (Fig.1, 2).

On the contrary, zero mortality was registered from untreated control. All the test botanicals have shown good level of mortality, ranging from 21.7% (Ginger at 1% concentration against *Solenopsis geminata*) to 76.7% (Garlic at 5% concentration against *Camponotus compressus*), which is significantly different from the untreated control (Table1). Turmeric 5% concentration is the best botanical extract that caused maximum mortality of *Solenopsis geminata* and *Camponotus compressus* 24 hr. after exposure (Fig.1). Similarly, after 48 hr. of house hold ant exposures, there was highly significant difference in toxicity among the botanicals at different concentrations. Maximum percentage mortality (100% and 95%) were recorded from Garlic against *Solenopsis geminata* and *Camponotus compressus* followed by concentrations; Turmeric, Mint, Tulasi, Neem and Ginger at 5% concentrations (Fig.2).

Mortality percentage of ants due to the six botanical tested was found concentration and time dependent as it was found to increase with an increase of the concentration and exposure time. In the present study *Camponotus compressus* possess least resistance than *Solenopsis geminata* and die soon. The result of this study help to provide a way to control ants by using botanical extracts. This is an eco-friendly control measure it will not harm the existence of other organisms.

Conclusion

The present findings demonstrated that most of the botanical extracts tested against ants, *Solenopsis geminata* and *Camponotus compressus* possess insecticidal (Ant) properties that can be

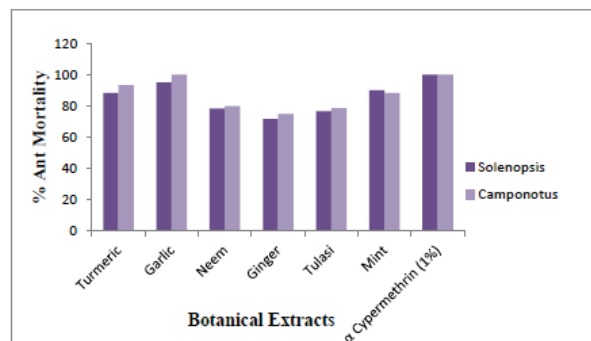


Fig.2 Percentage Mortality of Botanical Extracts At 48hr. Against *Solenopsis geminata* and *Camponotus compressus*

used in control of household ants. From the botanical extracts, Garlic was observed to be the most bio-potent botanical at higher concentration (5%) tested. The next best botanical were Turmeric as well as leaf extracts of Mint as this also caused higher mortality among the remaining botanicals at maximum concentration (5%) tested. The other botanicals were found to be moderately toxic to ant over 48 h of exposure. *Camponotus compressus* shows less resistance than *Solenopsis geminata*. These 6 botanicals can be obtained in our local area. These Bio pesticides would not pollute the environment. And these will not cause any damage to other non-target organisms. So it is better than other chemical insecticides. So they can be used inside the house against the common household pests.

Recommendations

Botanical extracts used in the present studies had repellency and toxicity effect on ants. Thus, they can be used to manage or control ants in domestic materials. There is no denial that potential field application of the botanical extracts against ants would require large volume of plant materials, thus a field study need to be conducted further apart from testing of large number of plants. Botanical pesticides are not harmful but may not be effective in all 6 cases. Turmeric cannot be sprayed on walls due to pigmentation. Pesticides should be used freshly prepared otherwise no effect.

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