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Dried Tobacco Leaves (Nicotania Tabacum) Kalachuchi Flower (Plumeria Acuminata) and Cymbopogon Decoction as Termite Exterminator

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ABSTRACT

Many people rely on commercially available pesticides to control pests at homes and in business. Most of these products are costly and contain chemicals like sulfuryl fluoride and arsenious oxide that may harm human health and other organisms. The purpose of this study is to produce an indigenous product that is effective, harmless, and cheaper to eradicate termites, specifically ground and wood termites.

In this study, the effectiveness of the mixture of the decoctions of dried tobacco leaves (*Nicotania tabacum*), fresh kalachuchi flowers (*Plumeria acuminate*) and lemon grass (Cymbopogon) as a termite killer was tested. There were various experimental set – ups; Set – up A was for testing the effectiveness of the tobacco leaves and lemon grass as a termite killer, Set – up B was for testing the effectiveness of the kalachuchi flowers as termite killer, and Set – up C.1, C.2., and C.3 were for testing the effectiveness of the combined decoctions with different ratios of Mixture A and B. The positive control set up was for testing the effectiveness of the commercial brand, MAPECON-Big R Spray, against the organic termite killer. Negative control set – up using water as spray was also used to compare against the organic product.

The most effective mixture that utilized tobacco, kalachuchi and lemon grass decoctions was Mixture C.2 with the ratio 1:3 (25% dried tobacco leaf and lemon grass decoctions and 75% kalchuchi flower decoction). Benzyl salicylate and benzyl benzoate from kalachuchi flowers which is known for its use anti-parasitic and fixative in floral perfumes shows good combination to suppress the strong smell of nicotine from the tobacco decoction which served as one of the benefits of the identified ratio.

Keywords: Nicotania tabacum, Plumeria acuminate, Cymbopogon

INTRODUCTION

Nowadays, we can no longer ensure the quality and safety of our woodwork and infrastructures due to the different insect infestations especially by termites. Human as we are, we can not keep track of the recent damage of our homes caused by these pests, so we must be prepared for the possibilities that may occur during our absence. As a matter of fact, our school Tuburan National High School is also infested with termites. School Cabinets and other fixtures made of wood are being eaten away, especially in laboratories where equipment is being kept. To address the problem, the researcher tried to investigate on the effect of dried tobacco leaves, kalachuchi flowers and lemon grass as an alternative to commercial termite killer. An organic and affordable termite killer can be a substitute to a commercial one because of its efficacy and affordability.

Tobacco,Kalachuchi plants and lemon grass are known to contain alkaloids that kill insects. This is the basis of this project with the objective to create a termite killer that is harmless to humans, cheaper and effective. Apparently, other people's notion about tobacco is that it is conventional risk to our overall health; this project wants to uphold that Nicotania tabacum is not only known for its psychoatic effect when used as a major component of its cigarettes but also for its potential to kill termites. Tobacco has nicotine. It functions as an antiherbivore chemical with particular specificity to insects; there fore nicotine was widely used as an insecticides in the past (Wikiedia.org) as well as lemon grass. Lemongrass (Cymbopogon citrates) plant

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leaves contained appreciable amounts of phytochemicals (alkaloids, glucosides, phenols, saponins, flavonoids, tannins, terpenoids and resins).

On the other hand, kalachuchi contains benzyle benzoate, not commonly found in most fragrant flowers; it may be used as an antiparasitic pesticides Rojas-Sandoval, J. (n.d.). *Plumeria rubra* (red frangipani). In *CABI Compendium*. https://doi.org/10.1079/cabicompendium.42060. This is one reason that the kalachuchi flowers may be tested for the probability of being an efficient termite killer and at the same time produce a pleasing smell that can overcome the scent of the tobacco leaf decoction.

MATERIALS AND METHODS

This study will be conducted at Tuburan National High School from July 1 to October 1, 2017. The outcome of the study may be tested on the localities to ensure the validity of the results.

Six experiments set – ups were used in conducting the study. The researcher made are used mainly of soldiers of ground termites, which is identified to be more aggressive. And, three set ups of wood termites were also used as experimental subjects for further support to the study. The number of test subjects is limited sources. There was no breeding of termites done due to time constraints. Likewise, the researcher delimits the study in determining the effectiveness of the dried tobacco leaves, fresh kalachuchi flower and lemon grass decoction. Any juice extract either from fresh tobacco leaves; or from the other parts of kalachuchi plant, aside from that of the flowers, is not considered.

Experimental Method/ Design

There were six experimental set-ups and two control set –ups used in this project. Set –up A is a 100 ml decoction from 45 g dried tobacco leaves and lemon grass and 135 ml distilled water, used to test the effectiveness of dried tobacco leaves and lemon grass as termite killer. Set –up B is a 100 ml decoction from 45 g fresh kalachuchi flowers and 135 ml distilled water, used to test the property of kalachuchi as potential pesticides. Set –up C is a mixture of dried tobacco leaves, fresh kalachuchi flowers and lemon grass decoction, used to test its efficacy as termite exterminator.

To test which combination is more effective, different ratios of concentrations were utilized as experimental set –ups. Experimental set –up C. 1 is 50% dried tobacco decoction and lemon grass; and 50% kalachuchi flower decoction (1:1). Experimental set –up C.2, is 25% dried tobacco decoction and lemon grass; and 75% kalachuchi flower decoction. Experimental set –up C.3 is 75% dried tobacco decoction and lemon grass; and 25% kalachuchi flower decoction.

The control set –ups used were 75% MAPECON (Big-R Spray) as commercial pesticides and 25% distilled water for positive control set –up, and distilled water spray as negative control set –up, which are used to compare for testing the effectiveness of the commercial brand against the organic termite killer.

To test the validity of the results of the experimentation, the researcher used three trials for every experimental set –up and control set –up.

RESULTS AND DISCUSSION

Table 1 shows the concentration level of Tobacco, lemon grass and Kalachuchi Decoction , Mixture 1 is Tobacco and lemon grass decoction with a mixture of 40 grams of dried Tobacco leaves, 5 grams lemon grass and 135 ml distilled water. Mixture B, is kalachuchi decoction with a mixture of 45 grmas of dried kalachuchi flowers and 135 ml distilled water. Mixture C. 1 is a combination of Mixture A and B with a ratio of 1:1 Mixture C. 2 is a combination of Misture A and B with the ratio of 1:3 Mixture C. 3 is a combination of Mixture A and B with the ratio of 3:1

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Table 1 Amount of Tobacco and Kalachuchi Decoction in Different Experimental Set -ups

Set –Up A (ml)	Set- Up B (ml)	Set- Up C.1 (ml)	Set- Up C.2 (ml)	Set- Up C.3 (ml)	Positive Control Set Up (ml)	Negative Control Set-Up (ml)
100 ml tobacco and lemon grass decoction	100 ml. kalachuchi extract	50 ml tobacco decoction and 75 ml kalachuchi extract	25 ml tobacco decoction and 75 ml kalachuchi extract	**75 ml** tobacco decoction and 25 ml kalachuchi extract	100 ml MAPECON Big Spray	100 ml distilled water

Table 2 shows the amount of decoction collected from 40 g of dried tobacco,5 grams lemon grass and 45 g of kalachuchi flowers mixd with 135 ml of distilled water. A total of 59 ml were collected from 5 times decoction process for dried tobacco leaves.

Prior to the actual experimentation, the researcher conducted a thorough observation and investigation on the effect of the experimental set –up C to ten soldiers and numerous workers of Ground termites. The researcher was able to observe the movement and effects to termites one minute every after the application.

Workers of ground termites died five seconds after the application, while one to two soldiers died before one minute. Majority were already weak and slow moving right after the application. Within the first five minutes, at least 3-5 soldiers were slowly dying. The researcher was able to observe u to ten minutes, most of the soldiers were dying. Furthermore, the researcher extended time up to 30 minutes but no significant observation were made except that all termites died. Thus, the researcher decided to use 10 minutes as observation time and 10 soldiers of Ground termites for every experimental set-ups and trials.

Table 2. Amount of Decoction Collected

Set –Up A (g)	Amount of Decoction Collected (ml)	From 45g of dried tobacco and 45 g of Kalachuchi (ml)	Flowers Mixed with 135 ml of distilled Water (ml)	(ml)	(ml)	Total Amount of Solution (ml)
	1st	2nd	3rd	4th	5th	
Kalachuchi (225g)	110 ml	130 ml	114 ml	**110 ml**	126 ml	950 ml
Tobacco and lemon grass (225 g)	35 ml	92 ml	60 ml	**98 ml**	68 ml	353 ml

CONCLUSIONS

Based on the results and discussions from the experimentations, shown in the tables, Nicotania tabacum, Cymbopogon and Plumeria acuminate decoction have the capability of being an effective substitute for a commercial termite killer.

This project, dried tobacco leaves, lemon grass and fresh kalachuchi flower decoction as a termite killer is also cost effective. The 500 ml commercial pesticides, MAPECON, was bought at 200 pesos. Comparatively, the total cost of the 100 ml of the dried tobacco leaves and lemon grass and kalachuchi flower decoction as termite killer is only 18 cents per ml from the organic termite killer, dried tobacco leaves and kalachuchi flower decoction.

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The researcher also identified this project as eco-friendly. This is supported as the researcher checked on the chemical content of commercial pesticides and its harmful effects to humans and other organisms like animals and compared it to the natural component of dried tobacco leaves and fresh kalachuchi flower decoction. Along the way of experimentation, the researcher did not encounter any irritation and negative effect from the materials and subjects used.

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