

Molluscicidal effect of dalandan and dayap fruit extract on golden apple snails e...



This chapter contains subtopics that talks about the problem in this research such as background of the study, conceptual framework, statement of the problem, null hypothesis, significance of the study, scope and delimitations of the study and definition of terms.

Background of the Study

Nowadays, the demands for every man's needs are drastically increasing. Consumption of our basic needs is at its peak because of our increasing population. There are many industries now that require twice the effort of labor than before, and one of which is in the agricultural industry. We cannot deny the fact that agricultural exports and imports all over the world are essential to maintain natural equilibrium and satisfy the needs of society which is why one of the main sources of livelihood in Philippines is farming. Many Filipino farmers rely on the sales that the industry offers them and the presence of such pests like rats, slugs or snails affects their crops/vegetation greatly thus, it is important to implement efficient and economical measures in protecting crops continuously.

The golden apple snails (*Pomacea canaliculata*) are presently considered as a rice pest of national importance. The illegal introduction of the golden apple snails (*Pomacea canaliculata*) took place in the 1980s through the aquarium trade. It was initially introduced by the private sector as an aquaculture species, particularly as a cheap source of protein. Later, it found its way to waterways and rice fields. In 1995, the reported damage of golden apple snails (*Pomacea canaliculata*) in rice farming was estimated in more than 800, 000 hectares all over the country. Estimated rice yield loss from golden apple snail infestation from 1985 to 1991 in the Philippines increased

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along with expanding infestation. Instead of becoming a boom to food production it became a bane in rice farming. Since then, researches on varied subjects, particularly on its control in rice farming, have been investigated.

With these problems, the researcher is motivated to conduct the study to determine the molluscicidal effect of dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract on golden apple snails (*Pomacea canaliculata*). The researcher believes that this can be of help to the increasing demands the agricultural industry faces. The researcher will conduct this study to know the constituents present in the independent variables and assess its effectiveness in eliminating golden apple snails (*Pomacea canaliculata*).

Conceptual Framework

The researcher will focus on determining the molluscicidal effect of dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract, in the case of this research, on golden apple snails (*Pomacea canaliculata*). In this way, the researcher can provide new alternative products to use that are cheaper but still efficient, promoting usage of alternative medicines from sources that can be easily found, and helping those who will benefit economically.

Input Process Output

Dalandan

(*Citrus aurantium*) and

Dayap

(Citrus aurantifolia)

fruits

Extraction

Experimentation

The Molluscicidal Property of Dalandan (Citrus aurantium) and Dayap (Citrus aurantifolia) fruit extract on Golden apple snails (Pomacea canaliculata)

Figure 1. 1 Conceptual Paradigm

Statement of the Problem

This study is to be conducted to determine the effects of dalandan (Citrus aurantium) and dayap (Citrus aurantifolia) fruit extract on golden apple snails (Pomacea canaliculata) as a molluscicide:

Specifically, the study aims to answer the following sub-problems such as: 1. What are the constituents of dalandan (Citrus aurantium) and dayap (Citrus aurantifolia) fruit extract? 2. What is the level of effectiveness of dalandan (Citrus aurantium) and dayap (Citrus aurantifolia) fruit extract on golden apple snails (Pomacea canaliculata) at different concentrations? 3. Is there any significant difference between the dalandan (Citrus aurantium) and dayap (Citrus aurantifolia) fruit extract and the positive control in eliminating golden apple snails (Pomacea canaliculata)?

Null Hypothesis

In this study, the researcher will test the null hypothesis at 0.05 level of significance. Ho: There is no significant difference between the dalandan

(Citrus aurantium) and dayap (Citrus aurantifolia) fruit extract and the <https://assignbuster.com/molluscicidal-effect-of-dalandan-and-dayap-fruit-extract-on-golden-apple-snails-essay-sample/>

positive control as a molluscicide on golden apple snails (*Pomacea canaliculata*).

Significance of the Study

As this world undergoes in a midst of modernization in technologies, there are also agricultural advancements being focused on by scientists. This might sound impressive to people but with these are different newly discovered disease-causing organisms to plants. New strains of viruses and unknown diseases have developed and most of the people are just depending on those costly products. If Filipinos are to use alternative products somehow, it can not only help families in their expenses but also the economy in developing new measures of allocating its resources. The following are the entities that will be benefited in this study. Agriculturists. Agriculturists will be aware of the potential uses of such plants specifically in this study, dalandan and dayap. They will have a broader knowledge in controlling pests in the field. Molluscicide manufacturers.

With this study, the manufacturers can think of certain innovations in their products or even as an additive. These manufacturers can cut the costly production of chemicals and just stick to a more economical way in eliminating golden snails. Farmers. The farmers are the ones who will benefit mostly in this study for the outcome that the researchers are expecting to come up with aims in eliminating or controlling pests, namely golden snails in their field. Students. Students can gain more knowledge on uses that our resources offer us. Chances of their interest in studying plant properties and active constituents will increase if they are more aware of the practical things that certain plants can do in our daily lives. Future Researchers. The <https://assignbuster.com/molluscicidal-effect-of-dalandan-and-dayap-fruit-extract-on-golden-apple-snails-essay-sample/>

result of this research can motivate other researchers to conduct future related studies. They can use this as a basis for their own researches. Given the information, they can therefore know which plant is appropriate to be used in a certain studies.

Scope and Delimitations of the Study

The molluscicidal effect of dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract on golden apple snails (*Pomacea canaliculata*) and its efficacy level are the only focus of this study. The researcher used sixty (60) golden apple snails (*Pomacea canaliculata*) which were gathered from Barangay Padilla, San Carlos City, Pangasinan. The said fruits were weighed equally having two (2) kilograms each and was gathered from Barangay Bani, San Carlos City, Pangasinan. The bottles had 100 mL of equally distributed solutions containing dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract at five different concentrations each. The independent and dependent variables used were delimited and only gathered within San Carlos City, Pangasinan. To determine the components of dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract that can be a useful substance in eliminating golden apple snails (*Pomacea canaliculata*), different researches and library works will be conducted by the researcher. The experiment will be performed in Virgen Milagrosa Special Science High School laboratory, San Carlos City, Pangasinan on the school year 2011-2012.

Definition of Terms

The terms in this study are defined to provide clear and better understanding of this study. Extraction. This is the process of separating soluble from <https://assignbuster.com/molluscicidal-effect-of-dalandan-and-dayap-fruit-extract-on-golden-apple-snails-essay-sample/>

solvents or accumulating the liquid form from any liquid-bearing material. Extraction will be done in this study to obtain the needed amount of dalandan and dayap fruit extract which will be compared on different concentrations. Molluscicide. Molluscicides are also known as snail baits or snail pellets. They are used against mollusks which are usually used in agriculture or gardening to control pests such as snails that can damage crops by feeding on them. In this study, the product will be of the same purpose as stated and will be compared by each concentration.

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter contains brief statements enumerating the related literature, related studies and synthesis of related studies. This chapter also gives the following information about the history and definition of the independent variables namely the dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit extract and the dependent variable which is the golden apple snails (*Pomacea canaliculata*).

Related Literature

This contains related literatures about the researcher's study to give further insights about golden apple snails (*Pomacea canaliculata*), dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit. The related literature was taken from different references whether local or foreign ones. Methods for Controlling Molluscs 2009 stated that novel materials for controlling molluscs such as snails and slugs are carbohydrates including cellulose, hemicellulose complexes, and/or lignin, for inducing death in molluscs. The materials are non-toxic, will not contaminate a drinking water supply, will not harm fish, <https://assignbuster.com/molluscicidal-effect-of-dalandan-and-dayap-fruit-extract-on-golden-apple-snails-essay-sample/>

birds or wild life, will not cause any harmful effects if swallowed or absorbed through the skin, will not harm children or pets, and can be safely eaten by domestic animals and livestock that may consume such dead molluscs.

The materials may be applied in various formulations at various water contents. The materials do not provide nutrition to the molluscs, and disrupt normal bodily functions resulting in death. An attractant may be included to encourage ingestion by the molluscs. Many citrus fruits contain a higher amount of carbohydrates, but are a good source of vitamins and fiber. Of the citrus fruits, grapefruits contain the least amount of carbohydrates with 8 g of carbohydrates per 100 g serving. Lemons, limes and oranges contain approximately 9, 11 and 12 g of carbohydrate, respectively. Snails and slugs like to hide and breed under leaves. Placing snails and slugs in a tin of salty water causes them to die quickly.

According to JSTOR Ambio, Vol 25, pp. 443-448, the golden apple snails (*Pomacea canaliculata*) was introduced intentionally into Asia in 1980 with the expectation that it could be cultivated as a high-protein food source for local consumption and as an export commodity for high income countries. It has since invaded Asians rice systems, where it is dispersed through extensive networks, and feeds voraciously on young rice seedlings.

Related Studies

This contains related studies about the research to support its objective. The related studies were taken from different published references.

In the study of Aguinaldo, H. A. and M. G Mina, they found out that Volatile oil from calamansi rind (*Citrus mitis* L.) was isolated and evaluated for

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molluscicidal action against *Pomacea caniculata* L. (golden kuhol). Three preparations at varying concentrations of volatile oil were prepared, i. e. T1 (10 percent volatile oil); T2 (20 percent Volatile oil); T3 (30 percent Volatile oil). These were tested against newly hatched golden kuhol. Mortality rate and percentage survival were considered. All the three volatile oil preparations were effective in controlling the *Pomacea caniculata* L. The potency of the volatile oil from calamansi rind increased as concentration increased and as time of exposure increased. The 30 percent volatile oil gave the highest mortality rate.

According to P. M. Jazet Dongmo, et al., Essential oils of three varieties of *Citrus aurantifolia* (Bearss, Mexican and “ Sans épines”) grown in Cameroon were extracted by hydrodistillation with yields of 0. 29, 0. 57 and 0. 25% respectively. The chemical analysis was carried out by gas chromatography and gas chromatography coupled with mass spectrometry. The three samples were found to be very rich in monoterpenes, and limonene was the major compound with 53. 92, 43. 53 and 51. 98% respectively. The determination of the antifungal activity was done by the incorporation technique. The three extracts exerted an inhibiting action on the radial growth of *Phaeoramularia angolensis* which is fungicidal. The MIC obtained is 1. 4 mg/ml for *C. aurantifolia* var. Mexican and 1. 5 mg/ml for Bearss and “ Sans épines” varieties. These three essential oils could constitute an alternative to chemical fungicides usually used for Citrus fruit crops. In addition, the essential oil of the Bears variety was fractionated and the fractions were tested in order to determine the active compounds. The most

active fractions are rich in neral and geranial, compounds which could thus be responsible for the activity of the crude extract.

It is said by Jorry Dharmawan that the volatile compounds of the hand-pressed peel oil from the selected citrus fruits from Asia, namely Indonesian Pontianak oranges (*Citrus nobilis* Lour. var. *microcarpa* Hassk.), Indian Mosambi (*Citrus sinensis* Osbeck) and Philippine Dalandans (*Citrus reticulata* Blanco), were characterized by GC-FID and GC/MS. A total of 32 compounds were found in Pontianak orange, 29 in Mosambi and 37 compounds in Dalandan peel oils. Limonene dominated the composition of each of the oils and most of the compounds were present in the concentrations less than 0.1%. The absence of some important contributor compounds to mandarin family in Pontianak orange show that it is a mandarin that has unique characteristic flavor. The characteristic compound of sweet orange oil, δ -3-carene, was found in Mosambi peel oil. The presence of γ -terpinene in Dalandan was exceptionally high (4.3%) compared with other cultivars. Isopiperitenone was the tentatively-identified volatile compound not frequently reported in other citrus fruits found in Dalandan peel oil. It could be the important contributor to the characteristic aroma of Dalandan despite its trace amount.

Synthesis of the Study

With regards to the related studies stated, it indicates that *Citrus mitis* L. has the ability in eliminating golden apple snails and only that specie of the genus *Citrus*. Carbohydrate-rich foods and certain volatile oils found in dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) makes it a potential molluscicide on golden apple snails (*Pomacea canaliculata*). It was

also stated that snails are repulsed from strong smelling substances and some of which can be gathered from the independent variables.

Chapter III

Research Methodology

This chapter presents the materials and methods that will be used in this research. This includes the research design, research subject, and locale, population of the sampling procedure, data collection and tools for data analysis.

Research Design

In this experimental study, the researcher used Randomized Complete Block Design (RCBD). This experimental design uses a group of test plants and animals as subjects of the study which are studied once but subsequent treatments applied are replicated to determine the cause of change. There is control in this design and the subjects had undergone randomization process.

Research Locale

The formulation of the alternative product to be used in this study and the actual experiment was conducted at Virgen Milagrosa Special Science High School laboratory, San Carlos City Pangasinan. The dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruit was gathered from Barangay Bani, San Carlos City, Pangasinan. The golden apple snails (*Pomacea canaliculata*) however came from Barangay Padilla St. San Carlos City, Pangasinan.

Research Subject

The researcher used sixty (60) golden apple snails (*Pomacea canaliculata*) as subjects. These were grouped into six (6) having ten (10) golden apple snails (*Pomacea canaliculata*) each.

Research Materials

The materials used in the study are weighing balance, bottle/sprayers, and liquid measuring devices such as beakers and graduated cylinders used to measure the amounts of the extract to be used in application. Dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruits were gathered weighing two (2) kilograms each where the extract needed for the experiment was obtained.

Procedures/Data Collection

The researcher gathered dalandan (*Citrus aurantium*) and dayap (*Citrus aurantifolia*) fruits in this study. The fruits were subjected to a weighing balance to meet the needed amount which is two (2) kilograms each to be used in the actual experiment before extracting its juice. After extracting on a beaker, the obtained extract was transferred into a graduated cylinder where it was measured again to determine the equal distributions needed in certain concentration given the fact that the researcher tested the dependent variables at different concentrations.

The extract and the positive control were placed in separate bottles of sprayer specifically the first group with 100% dayap (*Citrus aurantifolia*) fruit; the second group for the 100% dalandan (*Citrus aurantium*) fruit extract; the third group is for the 50% dalandan (*Citrus aurantium*) and 50% dayap

(*Citrus aurantifolia*) fruit extract mixture; the fourth group for the 25% dalandan (*Citrus aurantium*) and 75% dayap (*Citrus aurantifolia*) fruit extract mixture; the fifth group for the 75% dalandan (*Citrus aurantium*) and 25% dayap (*Citrus aurantifolia*) fruit extract mixture; and the sixth group for the positive control. There were sixty (60) golden apple snails (*Pomacea canaliculata*) subjected in this research which were divided into six (6) groups having ten (10) golden apple snails (*Pomacea canaliculata*) each. The groups of snail were tested in six (6) concentration-labeled basins. The set up was observed within two (2) hours of time interval for twelve (12) hours and the observations was recorded.