**SCIENCE INVESTIGATORY PROJECT**

Statement of the Problem and Study of Related Articles

**Group Members:**

*Name of Student 1*

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**Project Title:**

**Dried and Fresh Aratiles (*Muntingia calabura*) Fruits Against Mosquito Larvae**

**Introduction:**

*Aedes aegypti* (dengue mosquito), one of the most criticized insect in the world is known to spread diseases such as dengue or also called as breakbone fever. It belongs to the list of most common causes of death in the Philippines and there are over a hundred thousand dengue cases being reported each year. Herbal plants such as *Carica papaya* (papaya) and *Euphorbia hirta* (tawa-tawa) are commonly used to treat dengue. Such are said to increase platelet levels of dengue victims and this was proven by some researchers that conducted studies about this (Chin, 2014). *Muntingia calabura* (aratiles), one of the many species from the Family Tiliaceae, is a popular edible fruit in the Philippines known for its medicinal characteristics used in folk medicine throughout the world. Its fruits contain phenolic compounds that have substantial applications in agriculture as herbicides, insecticides and fungicides (Santana, et al., 2009). Carbohydrate, glycosides, tannin, proteins and amino acid of the fruit were also found to possess significant antioxidant activities (Krishnaveni and Dhanalakshmi, 2014). These chemical properties of this fruit can be used to produce a product to control the spread of the mosquito causing dengue. The increase of dengue cases in the country convinced the researchers to expand the search for insecticidal properties in medicinal plants and come up with a larvicide from *Muntingia calabura* (aratiles) fruits against mosquito larvae.

**Statement of the Problem:**

This study seeks to find answer to the main problem: What is the effect of aratiles fruits to the life span of mosquito larvae?

Specifically, it will determine the following:

* What is the effect of dried aratiles fruits to the life span of mosquito larvae?; and
* What is the effect of dried aratiles fruits to the life span of mosquito larvae?

**References:**

Chin, T. S. (2014, April 13). Alternative treatments for dengue fever. *The Star Online*. Retrieved July 20, 2016, from http://www.thestar.com.my/lifestyle/health/2014/0413/alternative-treatments-for-dengue-fever/

Krishnaveni, M., & Dhanalakshmi, R. (2014). Qualitative and Quantitative Study of Phytochemicals in Muntingia calabura L. Leaf and Fruits. World Journal of Pharmaceutical Research, 3(6), pp. 1687-1696.

Santana, C., Ferrera, Z., Padron, M., & Rodriguez, J. (2009). Methodologies for the Extraction of Phenolic Compounds from Environmental Samples: New Approaches. Molecules, 14, pp. 298-320.

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Methodology

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**Materials and Methods:**

**Preparation of Materials**

In testing the effect of fresh and dried aratiles fruit extract to the mosquito larvae, four fresh aratiles fruit concentrations and another four dried aratiles fruit concentrations were prepared. The four concentrations of fresh aratiles fruit extract which are 25%, 50%, 75% and 100% was prepared by diluting different amounts of fresh aratiles fruit extract in distilled water. And the four concentrations of dried aratiles fruit extract which are 25%, 50%, 75% and 100% was also prepared by diluting different amounts of dried aratiles fruit extract in distilled water.

**Mosquito Larvae Culture Preparation**

A plastic barrel was filled with stagnant water and placed under the sun. The midges and mosquito laid tiny rafts of dark brown eggs on the surface of water. Using cheesecloth, the larvae were collected every few days and put into a petri dish to prevent them from developing into pupae.



Figure 1. Flow diagram of data gathering procedure.

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Presentation of Data and Analysis

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**Presentation of Data and Analysis of Results**

Every five minutes, in one hour, the number of alive mosquito larvae was observed. Figure 2 the number of alive mosquito larvae after the treatment with dried and fresh aratiles fruits.

Figure 2. Average number of larvae killed in various concentrations of dried aratiles fruits.

The results of the three trials showed that in 25% concentration of extract from dried aratiles fruits, no mosquito larvae remained alive after 30 minutes of observation. The next setup which is 50% concentration of extract from dried aratiles fruits showed that no mosquito larvae remained alive after 25 minutes of observation. In 75% concentration of extract from dried aratiles fruits, which is the third setup, also showed that no mosquito larvae remained alive after 20 minutes and the pure extract from dried aratiles fruits showed that no mosquito larvae remained alive after 10 minutes of observation. After conducting the experiment, it showed that the most effective concentration is the pure extract from dried aratiles fruits.

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Conclusion and Recommendation

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**Conclusions:**

A larvicide from *Muntingia calabura* (aratiles) fruits extract was made and tested against mosquito larvae. Results showed that the most effective concentration is the 100% extract of dried aratiles fruit. 25%, 50%, 75% and 100% extract of dried aratiles fruits were able to kill all the mosquito larvae in varying time but the pure extract from dried aratiles fruits was able to kill all mosquito larvae in the fastest time. On the other hand, 25% and 50% extract of fresh aratiles fruit were not able to kill any mosquito larvae. In 75% extract of fresh aratiles fruits, one mosquito larvae was killed after an hour of observation. And lastly, 100% extract of fresh aratiles fruits was able to kill two mosquito larvae after an hour of observation. This shows that the pure extract of fresh aratiles fruit is the most effective of all. This study shows that the extract of dried aratiles fruits is more effective than the extract of fresh aratiles fruits in killing mosquito larvae.

**Recommendations:**

*Muntingia calabura* (aratiles) fruits is one of the common kind of fruit that is easy to find. It has a lot of properties and characteristics that is still not enrich because people are not giving attention to it. The following recommendations can be performed for future studies:

* test if the larvicide from aratiles can be developed into an insecticide; and
* determine how does the different concentrations of extract affect the mortality rate of the larvae.