**SCIENCE INVESTIGATORY PROJECT**

Project Title, Statement of the Problem, and Hypothesis

**Group Members:**

*Name of Student 1*

*Name of Student 2*

*Name of Student 3*

**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. This kind of disease is very common nowadays but the cure for this is very hard to find. 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).

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 fresh aratiles fruits to the life span of mosquito larvae?

**Hypothesis:**

Following are the hypotheses of this study:

* Dried aratiles fruit has no effect to the life span of mosquito larvae; and
* Fresh aratiles fruit has no effect 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/

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.

**SCIENCE INVESTIGATORY PROJECT**

Review of Related Literature

**Group Members:**

*Name of Student 1*

*Name of Student 2*

*Name of Student 3*

**Project Title:**

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

**Review of Related Literature**

*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. According to the Provincial Epidemiology Surveillance Unit (2015), the Cavite Provincial Health Office recorded 10,960 dengue cases and 46 deaths in seven districts of the province in the last 48 weeks since January 1. This kind of disease is very common nowadays but the cure for this is very hard to find. To lower the percentage of dengue cases, Department of Health (DOH) together with other agencies of the government conducted researches and programs about the preventions for this matter. Symptoms of dengue include high fever, rashes, severe headache, pain behind the eyes and mild bleeding of nose or gums. Other 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.

**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/2014/04/13/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.

Provincial Epidemiology Surveillance Unit. (2015, December 26). Over 10,000 dengue cases, 46 deaths recorded in Cavite. *All Pinoy News.* Retrieved July 20, 2016, from http://allpinoynews.com/over-10000-dengue-cases-46-deaths-recorded-in-cavite/

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.

**SCIENCE INVESTIGATORY PROJECT**

Methodology

**Group Members:**

*Name of Student 1*

*Name of Student 2*

*Name of Student 3*

**Project Title:**

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

**Methodology**

**Materials:**

**Following are the materials to be used in this study:**

* *100 grams dried and fresh aratiles fruits*
* mortar and pestle
* cheese cloth
* scissors
* gloves
* containers

**Methods:**

1. **Extraction of Fruits**

Dried aratiles fruits will be rinsed with tap water. Leaves will be cut into small pieces. Mortar and pestle will be used in pounding the leaves. After pounding, the extracted juice will then be placed on a cheese cloth. The procedure will also be repeated for the extraction of fresh aratiles fruits

1. **Mosquito Larvae Culture Preparation**

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

1. **Data Collection**

Each concentration will be transferred into a petri dish and five mosquito larvae will be placed into it. Each setup will be observed every five minutes for an hour. The number of alive mosquito larvae every five minutes will be recorded. This procedure will be repeated three times and the mean average will obtained.

1. **Data Analysis**

 Quantitative data obtained will be used to determine the mortality rate of the mosquito larvae. The initial number of alive mosquito larvae will be subtracted from the final number of alive mosquito larvae to determine the total number of larvae killed.