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Republic of the Philippines
EASTERN VISAYAS STATE UNIVERSITY
Tacloban City

"The Potential of Gmelina Fruit Extract as Natural Herbicide"
(Research Study)
Period: from October 1, 2014 and as of 2018

This research covers almost 4 years of self-funding of the proponent leader named Carl Jade D. Sabaldan (Bachelor of Science in Environmental Science student in Eastern Visayas State University). The research study has the overall goal of identifying the Potential of Gmelina fruit extract as Natural Herbicide. Thoroughly, by using the raw material (Fallen Gmelina fruits) as a residue for extracting in the experimental thesis /research study. Specifically, proponent conducted the research/project around the EVSU campus during the period.

Research Report

Title of the Project/Research Report: Monitoring of my research entitled: "The Potential of Gmelina Fruit Extract as Natural Herbide".
Source of Funds: The Proponent/Leader (Carl Jade D. Sabaldan)
Date Project started: November 12, 2014
Period Covered: S.Y. 2014-2016 of my research/thesis study.

Objectives of the Project Study:

- *To gather additional and appropriate documentation of my thesis/research study. (for the purpose of Research/Thesis study to be appreciated.)*
- *To enhance and contribute in support of the Implementation of "Ecological Solid Waste Management Act of 2000 in Eastern Visayas State University" and follow its prohibitions and other applicable LAWS on the EVSU campus.*

Brief Summary Accomplishments/Highlights of the study: [Work accomplished on the basis of the total work programmed for the period covered]:

Work Accomplished were done in summer/s and/or Quarterly/s during the research of the study.

1) *Conducting experiments in Laboratory Room in Science Building.*
2) *Cooperate/transact to the Janitors or Utilities about the spraying method in the areas and the segregation of fallen Gmelina fruits.*

**(Per Kilo of collected fallen Gmelina) x (Php 200.00 paid)*
**(Guidance, taking care and watching the sprayed grass and weeds for keeping it safe.)*

3.) Maintaining & gathering assorted procedures of my research study upon observing, visiting my research study in the campus were expected experiment conducted and subjected and consulting to the adviser with my reports.

Adminitrative, Technical and other Problems Encountered:

REPUBLIC ACT NO. 10068

AN ACT PROVIDING FOR THE DEVELOPMENT AND PROMOTION OF ORGANIC AGRICULTURE IN THE PHILIPPINES AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

Section 1 *Title.* - This Act shall be known as the ***"Organic Agriculture Act of 2010".***

Section 2 *Declaration of Policy.* - It is hereby declared the policy of the State to promote, propagate, develop further and implement the practice of organic agriculture in the Philippines that will cumulatively condition and enrich the fertility of the soil, increase farm productivity, reduce pollution and destruction of the environment, prevent the depletion of natural resources, further protect the health of farmers, consumers, and the general public, and save on imported farm inputs. Towards this end, a comprehensive program for the promotion of community-based organic agriculture systems which include, among others, farmer-produced purely organic fertilizers such as compost, pesticides and other farm inputs, together with a nationwide educational and promotional campaign for their use and processing as well as adoption of organic agriculture system as a viable alternative shall be undertaken.

Action Taken:

According to REPUBLIC ACT 9003 January 26, 2001 of Short Title - known as the "Ecological Solid Waste Management Act of 2000." States that.

Section 54. *Research on Solid Waste Management - The Department after consultations with the cooperating agencies, shall encourage, cooperate with, and render financial and other assistance to appropriate government agencies and private agencies, institutions and individuals in the conduct and promotion researches, experiments, and other studies on solid waste management, particularly relating to:*

- *the planning, implementing and operation of resource recovery and resource conservation systems;*
- *the development and application of new and improved methods of collecting and disposing of solid waste and processing and recovering materials and energy from solid waste;*
- *development of new uses of recovered resources and identification of existing or potential markets of recovered resources.*

In carrying out solid waste researches and studies, the Secretary of the Department or the authorized representative may make grants or enter into contracts with government agencies, nongovernment organizations and private persons.

According to REPUBLIC ACT 9003 January 26, 2001 of Short Title - known as the "Ecological Solid Waste Management Act of 2000." States that.

Section 48. *Prohibited Acts - The following acts are prohibited:*

- **Littering, throwing, dumping of waste matters in public places, such as roads, sidewalks, canals, esteros or parks, and establishment, or causing or permitting the same.*
- **Undertaking activities or operating, collecting or transporting equipment in violation of sanitation operation and other requirements or permits set forth in established pursuant.*
- **The open burning of solid waste.*

- *Causing or permitting the collection of non-segregated or unsorted wastes.*
- **The manufacture, distribution or use of non-environmentally acceptable packaging materials.*
- *Importation of consumer products packaged in non-environmentally acceptable materials.*
- **Importation of toxic wastes misrepresented as "recyclable" or "with recyclable content".*

METHODOLOGY

Fallen fruits are collected Eastern Visayas State University campus located at Salazar St, Downtown, Tacloban City, Leyte. In this study, the researchers will use the fruits as a sample for extraction.

The researchers will collect a Gmelina fruit which is fallen from the trees around the Eastern Visayas State University campus. After collecting, the researchers will wash the fallen Gmelina fruits with water to remove sand and other contaminants. After washing, fallen Gmelina fruit undergo sun drying for 1 day. Next step is the preparation of the set-ups. Gmelina fruits must be place in the table together with the laboratory apparatus. The researchers must remove the seeds each Gmelina fruits. Measuring of samples must be recorded in Balance/Triple Beam Balance –(Analytical, capable of accurately weighing to 0.0001 g.). Grams of Gmelina fruit must separated into four basins/beaker (500ml pyrex R) and each will be weigh again using the triple beam balance before pounding in a mortar and pestle. After pounding, the four separated un-seed Gmelina fruit in the basin/beaker, each of the samples will be weighed again and place in a Blender Machine for 100sec. Each samples will undergo filtration using a muslim cloth to squeeze the pure liquid extract and weigh using graduated cylinder (50 ml pyrex R.) "Opareke, 2005"

Quadrat Method: Quadrat Method was used as a Data collection for the sampling. Total station surveying equipment was used to establish in a 50 cm × 50 cm Quadrat grid (Fig. 2a and 2b). Quadrat numbering or labelling begins in the lower-left corner of each plot starting with A to D, such that Plot A is in the upper-left corner, Plot B is in the lower-left corner, Plot C is in the upper-right corner, Plot D is in the lower-right corner. Within each plots in the quadrat, researcher recorded the location and height (height of peanut grass, 11 cm) of all weedy plants that reached the net. All such grass per plot were also marked with label tags. All grass in the quadrat per were identified at least through scientific names and classification of growth and population and variety to genus and to species when possible

Results and Interpretation of Gmelina Extract sprayed in grass

In this research, Potential of Gmelina fruit extract implies the application of treatment 100% in concentration which is 100 ml using a triggered sprayer, it takes 100 pumps/pulls to empty the bottle sprayer about 16 minutes. It covers the whole plot (D) with an area of 25 cm^2 X 25 cm^2 part of the entire Quadrant. Horizontally sprayed within 45° in slope, height of 40 cm (depends on the height of the researcher who is 5"6') in spraying procedure. Almost whole part of plot (D) in the quadrants are wet (peanut grass & chick weed leaves are fully damped, moist and soaked with the treatment (Gmelina extract down to the stem to the ground soil).

Procedure conducted by the researcher after spraying in 5 weeks, it was found out that the study are now then solved and the procedures are effective. Scorings and data gathered per observation is/are calculated. Showing the data in table of this chapter.

Taking of pictures using a cellphone camera, 1 week up to 5 weeks over after the application of treatments the images taken from camera's shows the every weeks passed by, the number of Population, size, density and biomass of the sprayed weeds is decreasing, 1st sample square/quadrants (plot D) almost the whole part of the square is empty. Observation

through the naked eye, the sprayed weeds died, leaves disappeared, only the dead stems left. It reveals that the damage of treatment sprayed which is 100 % pure in concentration response to death of the weeds in plot D. This includes (Chlorosis, synthesis) and scored 0-10 is 10 which is 100% in value according to the table of Guidelines (Qualitative Assessment from the book of **the Principles of Weed Science, Second Edition-V. S. Rao - (Chapter 19 - page 497-450).**) *please see on next pages.*

Here is the result of Gmelina fruit extract in spraying in peanut grass. Tables, observations, calculations and analysis is also same are shown below.

Gmelina Extracts in Percent Concentration (which is 250 ml sprayed)	**Sprayed in Quadrant Sampling (Chick Weeds)**	**Total Weeds Infestation (Y)**	**Visual Observation Scale 0-10 (X)**	**Ground Cover Peanut Grass sprayed with Gmelina extracts** $Z = [100-10(X)]\frac{Y}{100}$
25%	Plot A	100	1	90
50%	Plot B	100	1	90
75%	Plot C	100	6	40
100%	Plot D	100	9	10

Table 2: Gmelina Extracts in Percent Concentration (which is 250 ml sprayed) Sprayed in Quadrant Sampling (Chick Weeds)

25% Concentration: $[100-10(1)]\frac{100}{100} = 90\ \%$ **Ground Cover on Peanut Grass**

50% Concentration: $[100-10(1)]\frac{100}{100} = 90\ \%$ **Ground Cover on Peanut Grass**

75% Concentration: $[100-10(6)]\frac{100}{100} = 40\ \%$ **Ground Cover on Peanut Grass**

100% Concentration: $[100-10(9)]\frac{100}{100} = 10\ \%$ **Ground Cover on Peanut Grass**

Recommendation:

* There are several herbicides being marketed as “organic” that are currently used for home garden. All are derived from plant oils, Extracts and work by inhibiting plants· respiration causing rapid desiccation and brown-off such as vinegar, clove oil ,citrus acids and garlic extractions, Like the reseach of Gmelina fruit extract which is effective be acknowledge and contribute for the advance of the modern Science and Technology.

References :

* "Plant Community Diversity and Tree GrowthFollowing Single and Repeated Glyphosate Herbicide Applications to a White Spruce Plantation"
By Philip G. Comeau and Erin C. Fraser

* "LONG-TERM EFFECTS OF HERBICIDE TREATMENTS ON SPOTTED KNAPWEED AND NON-TARGET PLANTS IN THE GRAND SABLE DUNES"by Katherine E. Grzesiak

* "In the University of Michigan (Natural Resources and Environment), Detroit, USA"
By Katherine E. Grzesiak

* From the book of "Research Methods in Weed Science: Statistics" by Christian Ritz, Andrew R. Kniss, and Jens C. Streibig. Page. 172-183.

* From the book of "Fencing Guidelines and Specifications for Conservation Easements"
in the year July 2003 prepared by Caitlin Cornwall and Mary K. Davis from Sonoma Ecology Centerin 1st St W, Sonoma, CA 95476, USA.

* **Journal of Agriculture**"Opareke, 2005"

* REPUBLIC ACT 9003

Prepared by:

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