PHYTOCHEMICAL SCREENING AND HEALTH BENEFITS OF SELECTED MEDICINAL PLANTS IN CANTILAN, SURIGAO DEL SUR, PHILIPPINES

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ABSTRACT

This is an experimental study aimed to determine the phytochemical constituents and the health benefits of three selected medicinal plants namely Hagonoy *(Chromolaena odorata)* and Anonang (*Cordia dichotoma).* Fresh plants' leaves were collected and air-dried for 4 days. Samples of the extracts were taken to the Department of Science and Technology (DOST) for the phytochemical screening. The results of the entire procedure led the researchers to conclude that the selected plants contain phytochemicals, such as Alkaloids, flavonoids, steroids, tannins, and quarternary bases and amine oxide that are indeed beneficial to our health.

Keywords: Phytochemical screening, Health Benefits, Hagonoy *(Chromolaena odorata),* Anonang (*Cordia dichotoma**)***

INTRODUCTION

Unpredictable occurrence of different kinds of diseases is one of the cases people are battling day by day. Regarding this, there is a very good way of finding an alternative, a cheaper and easier to find and that is through herbal healing. People often believe that all herbal medicines are safe since they are considered as natural, but behind the naturality of some herbs, lay possible harm that can be very serious.

Herbal medicine is the use of plant (herbs) to treat and enhance well-being of a person. Herbs can act on the body as strongly as pharmaceutically prepared medicine and need to be handled with care. So, the researchers have come up to the idea of having few plants, specifically Hagonoy (*Chromolaena odorata*) and Anonang (*Cordia dichotoma),* to be observed especially phytochemically to find out their chemical content and possibility of being beneficial to our health. Anchoring this study as the basis of species' selection is the basic principles of herbalism from *"A key to Galen's Art of Physick",* translation of Nicholas Culpeper (1652); the affinity of the herb pattern of disease, the affinity of to an organ system, and the affinity of the herb to the basic pattern of self-governance in the organism from the center to circumference. (Wood 2010). Although there are already available studies regarding this internationally, the researchers pushed the idea with the fact that the Philippines is a tropical country, and results may vary from different settings of the plants used.

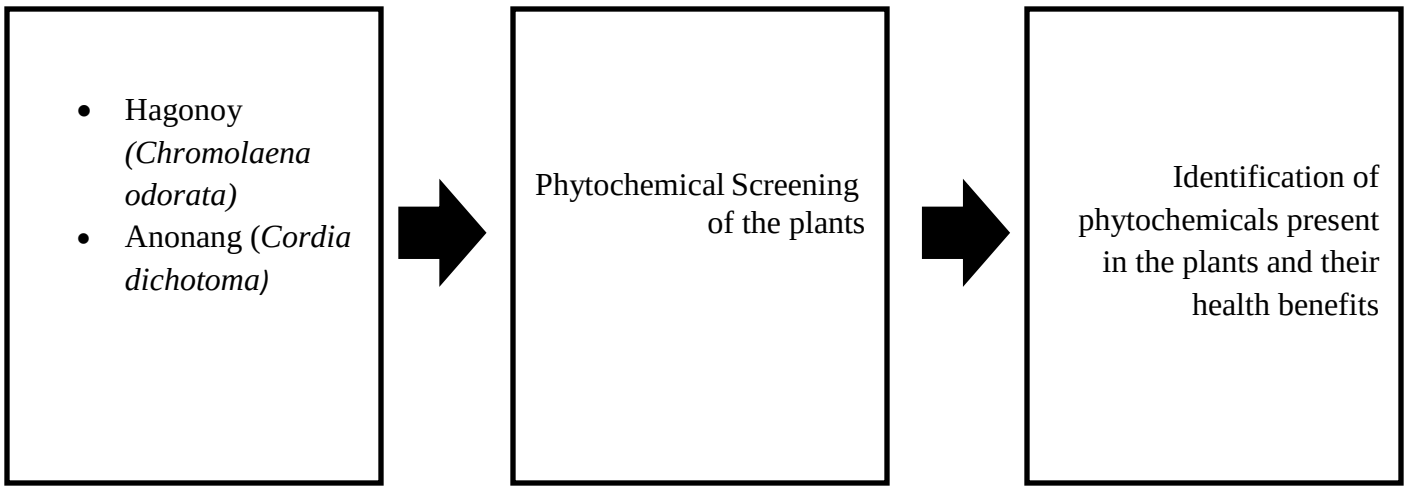

Figure 1. Schematic Diagram of the Study

STATEMENT OF THE PROBLEM

This study aims to identify the phytochemical constituents and health benefits of three selected medicinal plants. Specifically, it aimed to answer the following questions:

1. What are the phytochemical constituents of Hagonoy *(Chromolaena odorata)* and Anonang (*Cordia dichotoma)?*
2. What are the health benefits among the identified phytochemicals?

SIGNIFICANCE OF THE STUDY

This study deemed significance especially in the field of medicine, specifically in the discovery of new medicinal plants. The researchers believed that this could help the Department of Health (DOH) and the Department of Science and Technology (DOST) for a development of new medicinal plants that are useful and beneficial to our health. Also, this can help the community in their usage of medicinal plants. With new discoveries, there will be a variety of plants that can be used in their everyday needs. Having new herbal plants can prevent extinction of those that are commonly used by the community. This can also be a used as a reference to the future research studies regarding this topic.

SCOPE AND LIMITATIONS

This study focused only on the phytochemical analysis and the health benefits from the phytochemicals identified of three selected medicinal plants namely Hagonoy *(Chromolaena odorata)* and Anonang (*Cordia dichotoma).* The phytochemical analysis of the plants' extracts was analyzed by professionals from the Department of Science and Technology (DOST). Other concerns aside from this are no longer part of the study.

DEFINITION OF TERMS

To easily understand this study, the following terms are defined operationally:
Phytochemical analysis- process used to determine the contents of the plant.
Chromolaena odorata- the plant used for the experimentation. Locally known as Hagonoy.
Cordia dichotoma- Another palnt used in the study. Locally known as Anonang.

Health benefit. Refers to the advantages we can get from the plants under study

LITERATURE REVIEW

Traditional medicines which are used by generations passed to generations, indigenous beliefs and experiences disseminated to different cultures, served as an essential part of people's health maintenance, physical and mental illnesses, and prevention to diseases.
There are many different systems of traditional medicines, and the philosophy and practices of each are influenced by the prevailing conditions, environment, and geographic area within which it first evolved, however, a common philosophy is a holistic approach to life, equilibrium of the mind, body, and the environment, and an emphasis on heath rather than on disease. Generally, the focus is on the overall condition of the individual, rather than on the particular ailment or disease from which the patient is suffering, and the use of herbs is a core part of all systems of traditional medicine. (Engebretson 2002; Conboy et al. 2007; Rishton 2008; Schimidt et al. 2008).

Chromolaena odorata has been ethno medicinally used as a therapeutic agent for a variety of diseases, In this systematic review, the pharmacologic studies conducted on *Chromolaena odorata* indicate the immense potential of this plant in the treatment of conditions, such as wound healing, blood clotting anti-inflammatory, analgesic, antipyretic, diuretic, antimicrobial, anti-mycobacterial and many more. Flavonoids, triterpenes, chalcones, steroids which were isolated from this plant may be responsible for its pharmacological activities. (Chakraborty2011).

Cordia dichotoma, locally known as Anonang, is a medium sized tree with short crooked trunk; leaves are simple, entire and dentate, elliptical-lanceolate to broad ovate with a round base; flower are white in colour and small in lax terminal or axillary cyme; fruits drupe, yellowish brown, pink or nearly black when ripe with viscid sweetish transparent pulp surrounding a central stony part. *Cordia dichotoma* is one of the traditional medicinally important deciduous plants available all over India (Int J Pharm Res. 2011).

METHODOLOGY

The researchers collected fresh leaves of Hagonoy *(Chromolaena odorata)* and Anonang (*Cordia dichotoma)*. Washed with clean water and allow the leaves to dry for 4 days initially measures 600g each. To ensure the validity and legitimacy of the procedure samples were brought and submitted to the Department of Science and Technology testing laboratory for phytochemical screening. The procedure used for the aforementioned test was based on the Regional Standard and Testing laboratory of Department of Science and Technology. Professionals from the department placed 100g of the dried plants in an Erlenmeyer flask and treated with 80% ethyl alcohol and applied gentle suction after 48 hours, for the extraction of plant material. Then, they performed the test for Alkaloids, Laboratory Test Tube Method for Alkaloid Analysis, Test for Quaternary Bases and/or Amine Oxide, Steroids, The Keller-Kiliani Test, The Liebermann-Burchard Test: for Unsaturated Steroids, Flavonoids, Test for Leucoanthocyanins, Saponins, Tannins, The Test Tube Method, and Ferric Chloride Test. After the entire procedure, the phytochemical analysis was done, and the phytochemical constituents that are present in the plants were identified.

RESULTS AND DISCUSSION

This portion of the study is primarily concerned with the presentation, analysis, and interpretation of data to answer the problems in of this study.

TABLE 1: Summary results on the Phytochemical Analysis of *Chromolaena odorata's* Leaves

Phytochemicals	Presence	Remarks	Characteristics
Alkaloids	++	Moderately amount	Moderate precipitate
Test for Quarternary Bases and Amine oxide	+	Very light	Turbid only
Steroids -Keller-Killiani Test: 2-deoxysugars	+	Very light	Turbid only
-Liebermann-burchard Test: Unsaturated steroids	+	Very light	Turbid only
Flavonoids	+	Very light	Turbid only
Saponins	+	Very light	Turbid only
Tannins	_	Below detection	Negative/ no changes

As shown in the table above, alkaloids, quarternary bases and Amine oxide, Steroids, Flavonoids, and Saponins, are present in *Chromolaena odorata's* leaves extract. However, it also shows the absence of Tannins. From the table above, it is a clear manifestation that Hagonoy *(Chromolaena odorata)* leaves extracts contains phytochemicals that is beneficial for human consumption especially in the field of medicine.

TABLE 2: Summary results on the Phytochemical Analysis of *Cordia dichotoma's* Leaves

Phytochemicals	Presence	Remarks	Characteristics
Alkaloids	+	Very light	Turbid only
Test for Quarternary Bases and Amine oxide	+	Very light	Turbid only
Steroids -Keller-Killiani Test: 2-deoxysugars	+	Very light	Turbid only
-Liebermann-burchard Test: Unsaturated steroids	+	Very light	Turbid only
Flavonoids	+	Very light	Turbid only
Saponins	-	Below detection	Negative/ no changes
Tannins	+	Very light	Turbid only

The table shows the results of the phytochemical analysis of Anonang. Alkaloids, Quarternary bases and amine oxide, steroids, flavonoids, and Tannins are present in the plant's extracts. With the results, the plant showed contents that are beneficial to our health.

Health benefits among the identified phytochemicals

The presence of different kinds of phytochemicals in the selected plants is the reason why they could be considered as medicinal plants that could treat various diseases.

Alkaloids

Alkaloids are heterocyclic nitrogenated compounds, comprising the largest class of secondary plant metabolites. It has been found to exhibit physiological effects making it valuable in field of medicine. The pharmacologic action of alkaloids varies widely as analgesic, nacrotics, central stimulants, mycotics and causing a rise in blood pressure, but others produce a fall excessive hypertension. Alkaloids are produced by a large variety of organisms including bacteria, fungi, plants, and animals. They can be purified from crude extracts of these organisms by acid-base extraction. Alkaloids have a wide range of pharmacological activities including antimalarial (e.g. quinine), antiasthma (e.g. ephedrine), anticancer (e.g. homoharringtonine), cholinomimetric (e.g. galantamine), vasolidatory (e.g. vincamine), antiarrhytmic (e.g. quinidine), analgesic (e.g. morphine), antibacterial (e.g. chelerythrine), an danthyperglycemic activities (e.g. piperine). Many have found use in traditional or modern medicine, or as starting points for drug discovery. Other alkaloids possess psychotropic (e.g. psilocin) and stimulants activities (e.g. cocaine, caffeine, nicotine, theobromine), and have been used in entheogenic rituals or as recreational drugs. Alkaloids can be toxic too (e.g. atropine, tubocurarine). Although alkaloids act on a diversity of metabolic systems in humans and other animals, they almost uniformly evoke a better taste (Amirkia, 2014).

Flavonoids

Flavonoids are considered as antioxydants. Research studies seem to indicate that plant flavonoids, which are mainly found in cereals and herbs, have beneficial effect against astherosclerosis, osteoporosis, diabetes mellitus, allergy, inflammation, microbial activity and certain cancers. Studies have shown that flavonoids prevent the oxidation of low-density lipoprotein there by reducing the risk for the development of the astherosclerosis (Disabled Word 2016)

Steroids

Steroids are synthetic versions of hormones the body produces naturally. For decades, the medical community has acknowledged the effectiveness of steroids in building muscles and improving athletic performance. "It helps your body to build more muscles, helps you recover from exercise more quickly so you can exercise harder and more frequently" said Philip Wenger, an assistant professor at St. Louis College of Pharmacy. Doctors say users may also benefit from a placebo effect that spurs them to train harder. There are several prescribed usages of steroids. Before bone marrow transplants became common, steroids were used for patients with anemia. They have been used for patients with AIDS and other syndromes that cause muscle depletion and weight loss. Steroids can spur healing in burn patients. Some types of steroids are used to

reduce inflammation. The drugs used to treat asthma attacks are a form of steroid (McGwire 2010).

Tannins

The anti-microbial property of tannic acid can also be used in food processing to increase the shelf-life of certain foods, such as catfish fillets. Tannins have also been reported to exert other physiological effects, such as to accelerate blood clotting, reduce blood pressure, decrease the serum lipid level, produce liver necrosis, and modulate immunoresponses (Chung 1998).

Saponins

Saponins usually exert a powerful haemolytic action on the red blood cells and are highly toxic when injected into the bloodstream. Plant materials containing Saponins have long been used for their detergent properties. Saponins are glucosides with foaming characteristics. Saponins consist of a polycyclic aglycones attached to one or more sugar side chains. The aglycone part, which is also called sapogenin, is either steroid (C27) or a triterpene (C30). The foaming ability of Saponins is caused by the combination of a hydrophobic (fat soluble) sapogenin and a hydrophilic (Water soluble) sugar part. Saponins have a bitter place. Some Saponins are toxic and are known as sapotoxin. Saponins bind with bile slat and cholesterol in the intestinal tract. Bile salts form small micelles with cholesterol facilitating its absorption. Saponins cause a reduction of blood cholesterol by preventing its re-absorption. Studies have shown that Saponins have antitumor and anti-mutagenic activities and can lower the risk of human cancers, by preventing cancer cells from growing. Saponins seem to react with the cholesterol rich membranes of cancer cells, thereby limiting their growth and viability. Roa and colleagues found that Saponins may help to prevent colon cancer and as shown in the article "Saponins as anti-carcinogens" published in The Journal of Nutrition (1995). Some studies have shown that Saponins can cause apoptosis of leukemia cells by inducing mitotic arrest. Plants produce Saponins to fight infections by parasites. When ingested by humans, Saponins also seem to help our immune system and to protect against viruses and bacteria. Studies with ovariectomized induced rats have shown that some Saponins, such as the steroidal Saponins from Anemarrhena asphodeloides, a Chinese herb, have a protective role on bone loss (Madudid et al, 1995)

CONCLUSIONS

Based from the results revealed of the phytochemical analysis, there is a clear manifestation that the two selected plants namely Hagonoy *(Chromolaena odorata)* and Anonang *(Cordia dichotoma)* contains phytochemical constituents such as Alkaloids, quarternary bases and amine oxide, Flavonoids, Tannins, and Saponins, that are beneficial to our health.

ACKNOWLEDGEMENT

The researchers are very much thankful to the Almighty Father, who has been the source of all strength and possibility of this study.
To their families, they would like to extend their heartfelt gratitude for being on their side from the very beginning up to the success of the experimentation.

To everyone who has been part of this research journey, the researchers are very much thankful to all of you.

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