

**PHYTOCHEMICAL ANALYSIS AND EVALUATION OF  
CYTOTOXICITY AND GENOTOXICITY OF  
*Breynia androgyna* L. (BINAHIAN)  
LEAF EXTRACT**

**THESIS**

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AND GENOTOXICITY OF *Breynia androgyna* L.  
(BINAHIAN) LEAF EXTRACT**

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## ABSTRACT

**COSTA, CHRISTIAN JOSHUA S. Phytochemical Analysis and Evaluation of Cytotoxicity and Genotoxicity of *Breynia androgyna* L. (Binahian) Leaf Extract.** Undergraduate Thesis. Bachelor of Science in Biology major in General Biology. Cavite State University, Indang, Cavite. June 2019. Adviser: Ms. Liwayway P. Taglinao.

A study was conducted to assess the cytotoxicity and genotoxicity of *Breynia androgyna* L. (Binahian) ethanolic leaf extract using *Allium cepa* L. (Onion) test. Phytochemical analysis was performed on the leaf ethanolic extract of *B. androgyna* plant. In accordance, *B. androgyna* extract was diluted into different concentrations of plant extract as the treatment groups together with control groups. Six groups of onion bulbs were submerged into different treatment groups for two days and the morphological effects of the treatment were observed and documented. Onion roots were harvested and fixed for microscopic observation of the mitotic index and chromosomal aberrations.

This study showed that the phytochemical compounds that were present on the *B. androgyna* consist of tannins, flavonoids, phenolics, alkaloids and steroids. There is a significant difference on the onion root length when submerged to *B. androgyna* extract in comparison with the negative control group ( $p < 0.05$ ). Thus, there is a significant inhibition of mitotic activity in the onion group treated with plant extract compared to the negative control ( $p < 0.05$ ). On the other hand, the inhibition of the mitotic activity was highly significant in the 750  $\mu\text{g/mL}$  and 1000  $\mu\text{g/mL}$  *B. androgyna* plant extract. One thousand  $\mu\text{g/mL}$  *B. androgyna* plant extract decreases mitotic index at 32% thus signifying it as having sublethal effects on an organism. The number of chromosomal aberrations increases as the level of concentration of plant extract increases compared to

the negative control (tapwater). There was statistically significant differences at all the values except for 250 µg/ml *B. androgyna* extract concentration and 500 µg/mL *B. androgyna* extract concentration ( $p < 0.05$ ).

Hence, the leaves of *B. androgyna* are commonly utilized by human as food or medicine as revealed by the survey. However, *B. androgyna* plant leaves, if consumed or applied at certain doses (approximately beyond 500 µg/mL), will induce a cytotoxic and genotoxic effect on an organism.

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**INTRODUCTION**

Medicinal plants have been greatly used for traditional medicine of many countries for centuries. It is estimated that 80% of the world's population of the world's population still depend on plants for their primary health care (Ekor, 2014). Plants have been recognized for their medicinal value because of the substances they contain that create a physiological action on the human body. Alkaloids, resins, tannins and essential oils are some examples of these substances. However, medicinal plants may have cytotoxic or genotoxic substances as well. Excessive usage of some medicinal plants can cause harmful effects on humans instead of being beneficial (Olowa & Nuñez, 2013). Insufficiency on information about the cytotoxicity and genotoxicity of medicinal plants that people have been using for ages can lead to the formation of potential mutagenic or genotoxic hazards (Olowa & Nuñez, 2013; Askin Celik & Aslanturk, 2010). Further