

**PHYTOCHEMICAL ANALYSIS, CYTOTOXICITY AND TERATOGENIC  
ACTIVITY OF *Piper betle* L. UTILIZED BY THE AGTA  
COMMUNITY IN CASIGURAN, AURORA**

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An Undergraduate Thesis Submitted to the Faculty of the Department of Biological  
Sciences, College of Science, Central Luzon State University,  
Science City of Muñoz, Nueva Ecija, Philippines  
in Partial Fulfilment of the Requirements  
for the Degree of

**BACHELOR OF SCIENCE IN BIOLOGY  
(Major in Zoology)**

**JULY 2023**

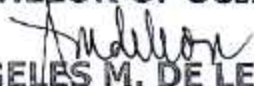


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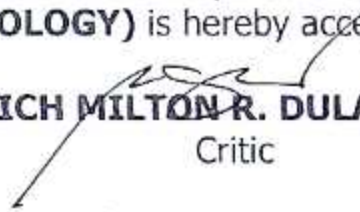
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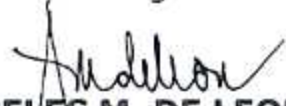
  
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## BIOGRAPHICAL SKETCH

The author, Czarina Carla S. Pimentel, is a 22-year-old daughter of Mr. and Mrs. Zaldy F. Pimentel and the eldest among the two children. She was born at San Jose City General Hospital in San Jose City, Nueva Ecija on March 3, 2001 and raised at Brgy. Porais, San Jose City, Nueva Ecija.

The author was a consistent honor student during her primary education at Porais Elementary School and she graduated 3<sup>rd</sup> honorable mention of the batch 2012. She was fond of joining athletics, journalism and beauty contest in her primary and secondary education. She graduated junior and senior high school with a high honor at Porais High School. She was a BS in Biology major in Zoology student and a consistent academic scholar throughout her stay at Central Luzon State University. She had her on-the-job training at Small Ruminant Center in Central Luzon State University from June 2020 to February 2023.

The author had attended several seminars and webinars which added to her knowledge on biology and related sciences. She participated in COOP Youth Planet (CYP Production House) at Philippine Carabao Center on 2019. The author also participated in Equipping Second Liners in the Dairy Buffalo Farming Sector for Sustainability and Food Security at Philippine Carabao Center on 2021.

## ACKNOWLEDGEMENTS

The author would like to express her heartfelt gratitude to all people who willingly bestowed their time and effort to accomplish this undergraduate thesis paper.

To her adviser, Dr. Angeles M. De Leon, for giving her time to the full extent, for her proficient ideas and suggestions, helpful assistance during the thesis work, a supportive adviser during overtime hours, as well as for facilitative advices during editing and correcting this paper, and for being a soul-lifter during doubt times.

To her critic, Dr. Rich Milton R. Dulay, for sharing his rational knowledge and considerate suggestions and recommendations on correcting this paper.

To her statistician, Mr. John Closter Olivo, for being always available for her statistics and for his support and kindness during the thesis work.

To her parents, Zaldy and Alma; sibling, Jan Aldrin; and loved ones for their love and financial support and for being her inspiration.

To the people who has a special place in her heart, friends namely Sheila, Allen and Lorie, for their warm moral hand-in-hand support in finishing this thesis; and music team, intercessors, and pastors for their prayers during and after her final defense.

Above all, the author wishes to express her gratitude to almighty God for giving her the spiritual enlightenment wisdom and constant flow of ideas which help her great deal, for lighting up the lamp of hope, encouragement and patience to the success of her thesis. This undergraduate thesis paper would not be completed without His guidance, grace and overflowing blessings.

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## ABSTRACT

**PIMENTEL, CZARINA CARLA S.**, Department of Biological Sciences, College of Science, Central Luzon State University, Science City of Muñoz, Nueva Ecija Philippines, **JULY 2023, PHYTOCHEMICAL ANALYSIS, CYTOTOXICITY, AND TERATOGENIC ACTIVITY OF *Piper betle* L. UTILIZED BY THE AGTA COMMUNITY IN CASIGURAN, AURORA.**

Adviser: ANGELES M. DE LEON, Ph.D.

The Philippines is recognized as one of the Earth's most important biodiversity with approximately 13,000 plant species. Many of these plants are widely used as traditional alternative medicine including the *Piper betle*. The use of *P. betle* has been part of life and culture among the Agta community, an indigenous group that inhabits the coast of Pacific Ocean and the hinterlands of Sierra Madre mountains in eastern part of Luzon, Island, Philippines. Phytochemicals, cytotoxicity and teratogenic activity of *P. betle* were screened and determined. In phytochemical screening test, six secondary metabolites were found in *P. betle* such as essential oils, anthrones, phenols, flavonoids, tannins, and anthraquinones. The *P. betle* ethanol extract projected a LC<sub>50</sub> of 3000.4 which suggest non-toxic based on the brine shrimp lethality assay. The *P. betle* ethanol extract generally exhibited teratogenic effects against developing *Danio rerio* embryos exposed to  $\geq 100$  ppm during the teratogenicity assay wherein malformation of tail, stunted tail, limited movement, scoliosis, and little to no pigment were the notable lethal effects of the extract to the developing embryos. The varying treatment concentrations of *P. betle* ethanol extract significantly revealed 100% hatchability was completed to concentrations  $\leq 10$  ppm during 48 hpta. Overall, due to the cytotoxic and teratogenic activities of *P. betle* the findings serve as a

contribution to the other sources for recreating broad studies in preventing, treating various diseases and in developing new, accessible medicinal drugs that will benefit the community. Importantly, the study shall bring contribution to the preservation and promotion of indigenous knowledge in traditional medicine.

**Keywords:** cytotoxic; *Danio rerio* embryo; medicinal drugs; *Piper betle*; teratogenic

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