



De La Salle University – Dasmariñas  
GRADUATE PROGRAM

**EFFECTS OF CRUDE PHYTOPIGMENTS EXTRACTED  
FROM *Spirulina platensis* AND *Chlorella vulgaris*  
ON THE ANGIOGENESIS OF CHICK EMBRYO  
CHORIOALLANTOIC MEMBRANE (CAM)**

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### ABSTRACT

Name of Institution: De La Salle University – Dasmariñas  
Address: Dasmariñas, Cavite  
Title: **Effects of Crude Phytopigments Extracted from *Spirulina platensis* and *Chlorella vulgaris* on the Angiogenesis of Chick Embryo Chorioallantoic Membrane (CAM)**  
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#### STATEMENT OF THE PROBLEM:

The study determined the effects of crude phytopigments extracted from *S. platensis* and *C. vulgaris* on the angiogenesis of 10-day old chick embryo chorioallantoic membrane (CAM).

Specifically, the following questions were answered:

1. What are the effects of phycocyanin crude extract from *S. platensis* and chlorophyll crude extract from *C. vulgaris* on the angiogenesis of CAM of 10-day old chick embryo?
2. Are there significant differences in the angiogenic effects of different concentrations of phycocyanin crude extract from *S. platensis*



and chlorophyll crude extract from *C. vulgaris* on the CAM of 10-day old chick embryo?

3. Is there a significant difference in the angiogenic activities induced by crude phycocyanin from *S. platensis* and chlorophyll crude extract from *C. vulgaris* on the CAM of 10-day old chick embryo?

**SCOPE AND COVERAGE:**

The study focused on the angiogenic effects of the following different concentrations, 150 ppm, 200 ppm, and 300 ppm, of crude phycocyanin from *S. platensis* and crude chlorophyll from *C. vulgaris* using the CAM of 10-day old chick embryo. The angiogenic activity induced by different concentrations of crude phytopigments was based on the number of collaterals or branch points formed in the CAM two days after the administration of the phytopigments.

It is not the intention of the study to identify the other components of the crude extract or to establish any pharmaceutical potential of the extract. The entire study lasted for eight to nine months.

**METHODOLOGY:**

This experimental study employed the randomized complete block design (RCBD) with four treatments,  $T_0$  = negative control (phosphate buffer/acetone buffer),  $T_1$  = 150 ppm crude phycocyanin; 150 ppm crude chlorophyll,  $T_2$  = 200 ppm crude phycocyanin; 200 ppm crude chlorophyll,



and  $T_3 = 300$  ppm crude phycocyanin; 300 ppm crude chlorophyll. Each treatment was replicated three times.

The experimental procedure, including the extraction of crude phycocyanin from *S. platensis* and crude chlorophyll from *C. vulgaris* and the preparation and observation of the CAM of test embryos was performed at the Biology Research Laboratory of De La Salle University - Dasmariñas. Incubation and administration of different concentrations of crude phytopigments were conducted at Farmbreed Agricultural Supplies located at Quezon Avenue in Quezon City. The entire research procedure lasted for twelve weeks.

#### MAJOR FINDINGS

After careful experimentation, the following major findings resulted from this investigation:

1. Test embryos treated with 150 ppm ( $T_1$ ) of crude phycocyanin extracted from *S. platensis* formed an average of 51.19 branch points while those treated with 200 ppm ( $T_2$ ) and 300 ppm ( $T_3$ ) of the crude extract formed an average of 26.13 and 21.27 branch points respectively, a decrease of more than half compared to that of the control treatment. Similar results were observed for the test embryos treated with crude chlorophyll extracted from *C. vulgaris*. An average of 45.04 branch points were formed from the CAM of test embryos treated with 150 ppm



(T<sub>1</sub>) of crude chlorophyll. While only an average of 25.54 and 20.54 branch points were formed for those treated with 200 ppm (T<sub>2</sub>) and 300 ppm (T<sub>3</sub>) of the crude extract respectively.

2. One-way ANOVA reveals that the crude phycocyanin extracted from *S. platensis* had a significant effect on the angiogenesis on the CAM of the different experimental treatments. The crude extract of phycocyanin significantly inhibits the formation of blood vessels in the CAM of the test embryos. Likewise, ANOVA also reveals that the crude chlorophyll extracted from *C. vulgaris* had a significant effect on the angiogenesis on the CAM of the different experimental treatments. The crude extract of chlorophyll significantly inhibits the formation of blood vessels in the CAM of the test embryos. Thus, the hypothesis saying that there is no significant difference in the angiogenic effects among different concentrations of crude phycocyanin extracted from *S. platensis* and crude chlorophyll extracted from *C. vulgaris* on the CAM of 10-day old chick embryo was rejected.

3. ANOVA reveals that there was no significant difference between the crude extract of phycocyanin from *S. platensis* and the crude extract of chlorophyll from *C. vulgaris* in inhibiting angiogenesis to CAM of the test embryos. Both phytopigments were effective angiogenesis inhibitors. Thus the hypothesis saying that there is no significant difference in the



angiogenic effects between crude phycocyanin from *S. platensis* and crude chlorophyll from *C. vulgaris* on the CAM of 10-day chick embryo was accepted.

#### CONCLUSIONS

Based on the findings presented, the following conclusions were drawn:

1. Both crude phycocyanin and crude chlorophyll extracted from *Spirulina platensis* and *Chlorella vulgaris* respectively, are angiogenesis inhibitors as shown by the continuous decrease of the vascular density index of the CAM of 10-day old chick embryo as their concentrations increased.
2. Sheffe method reveals that 150 ppm of crude phycocyanin was not able to significantly inhibit the angiogenesis on CAM of chick embryo but only 200 ppm and 300 ppm. On the other hand, using the same statistical method, all experimental treatments of crude chlorophyll were able to significantly inhibit the angiogenesis on the CAM of chick embryos.
3. There is no significant difference in the angiogenic effects between crude phycocyanin from *S. platensis* and crude chlorophyll from *C. vulgaris* on the CAM of 10-day chick embryo, meaning that both phytopygments induced the same effect as angiogenesis inhibitors as revealed by one-way ANOVA.





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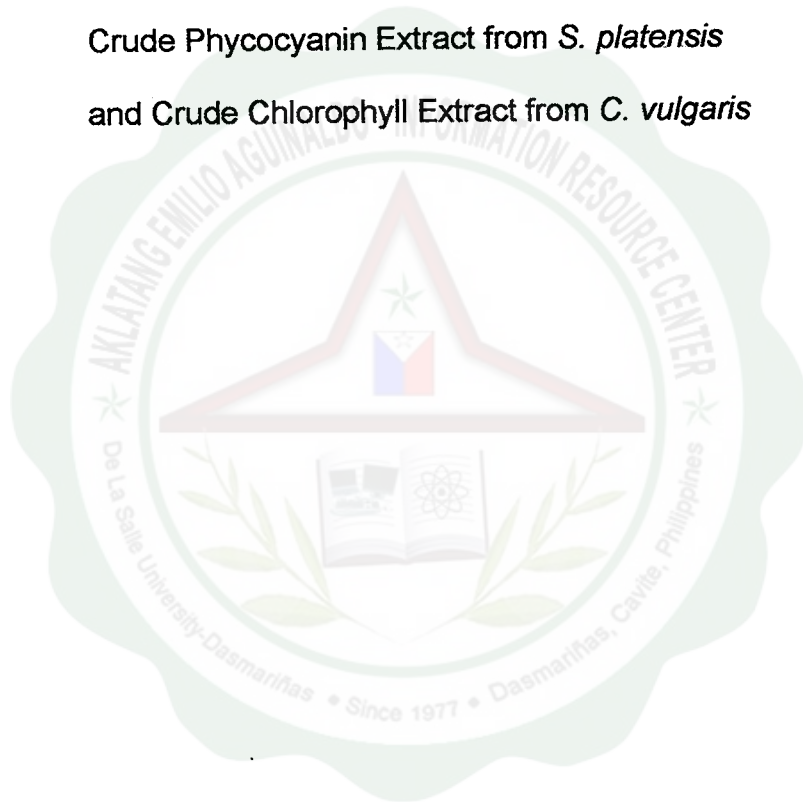


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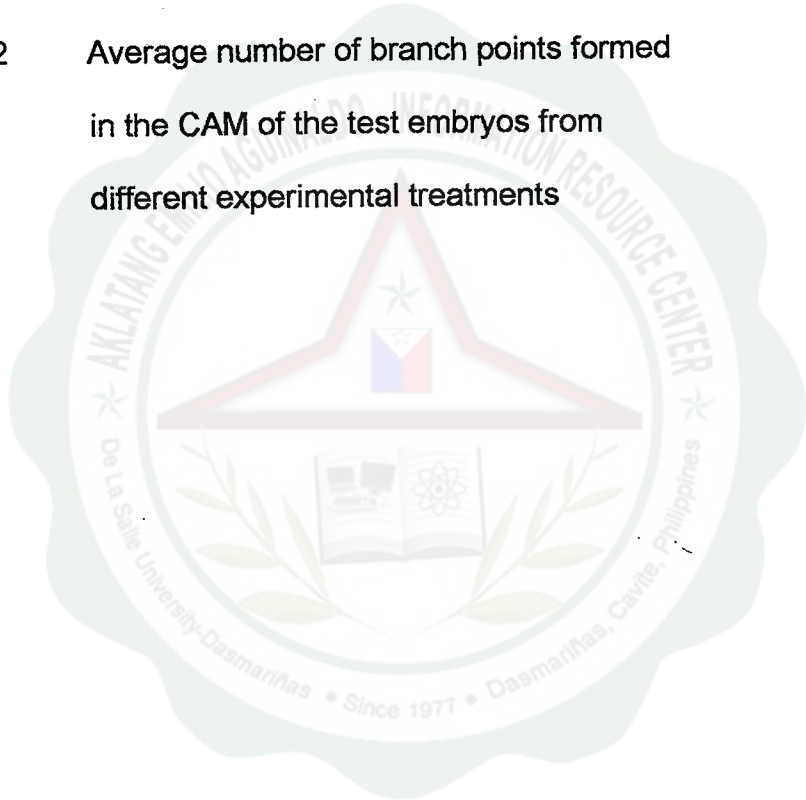
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