Potential Biological Activity of *Litchi chinensis*

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Introduction:

Litchi chinensis, or Lychee, is a fruit of the soapberry family. Native to Eastern India, Southeast Asia, and China, the fruit is used to fight viruses, the common cold, and treat kidney problems. The fruit is known to be high in antioxidants such as β-carotene, rutin, Vitamin C, and epicatechin.[1] Rutin is an antioxidant known to produce collagen and Vitamin C in the body. β-carotene is a chemical that produces the red pigment of the fruit. The seed of the fruit is known to contain a poisonous chemical known as methylene cyclopropyl glycine.[2] This chemical is known to cause hypoglycemia. The objective of this study to measure the total phenolic and antioxidant levels of each part of the fruit (coat, pulp, and seed).

Materials & Methods:

Commercial samples of the fruit were dried at a constant weight, ground, and placed in 20mg/mL of water. They were then dissolved in boiling water for 15 minutes to produce the extract used.

Folin-Ciocalteu Method: This method is traditionally used to measure the total phenolic content of extracts. The values were evaluated using Folin-Ciocalteu's protocol measuring aborbance at 765nm. Total phenolic content is expressed in mg/mL comparable to Gallic acid equivalents.

ABTS Radical Assays: This method is traditionally used to measure the antioxidant levels of extracts. The values were evaluated using the reduction of ABTS radical cation measured by 734nm. Antioxidant levels are expressed in mg/mL comparable to Trolox equivalents.

Results

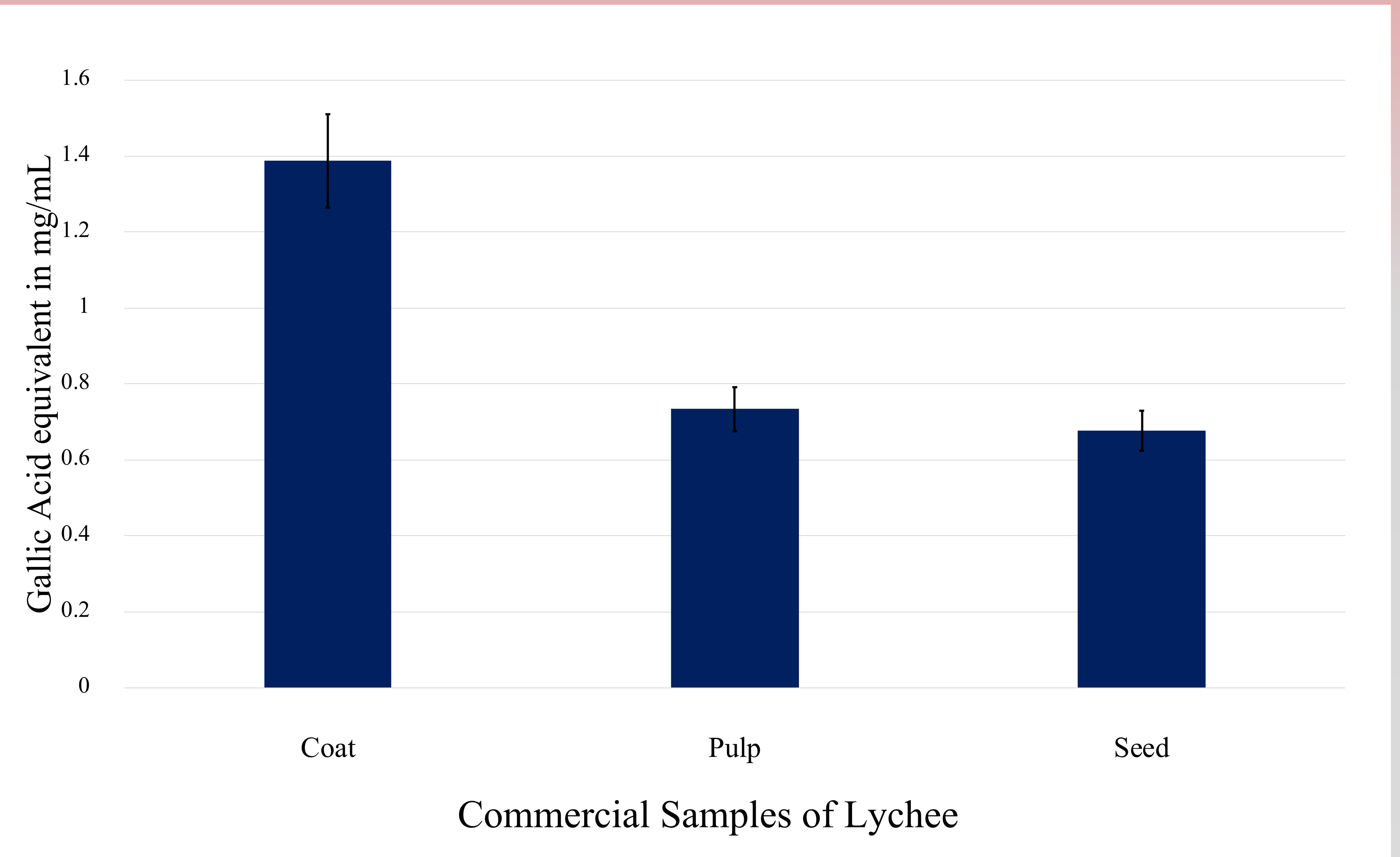

Figure 1: Total Phenolic Content of the coat, pulp, and seed from the Lychee. Standard error is represented by the bars present on the graph.

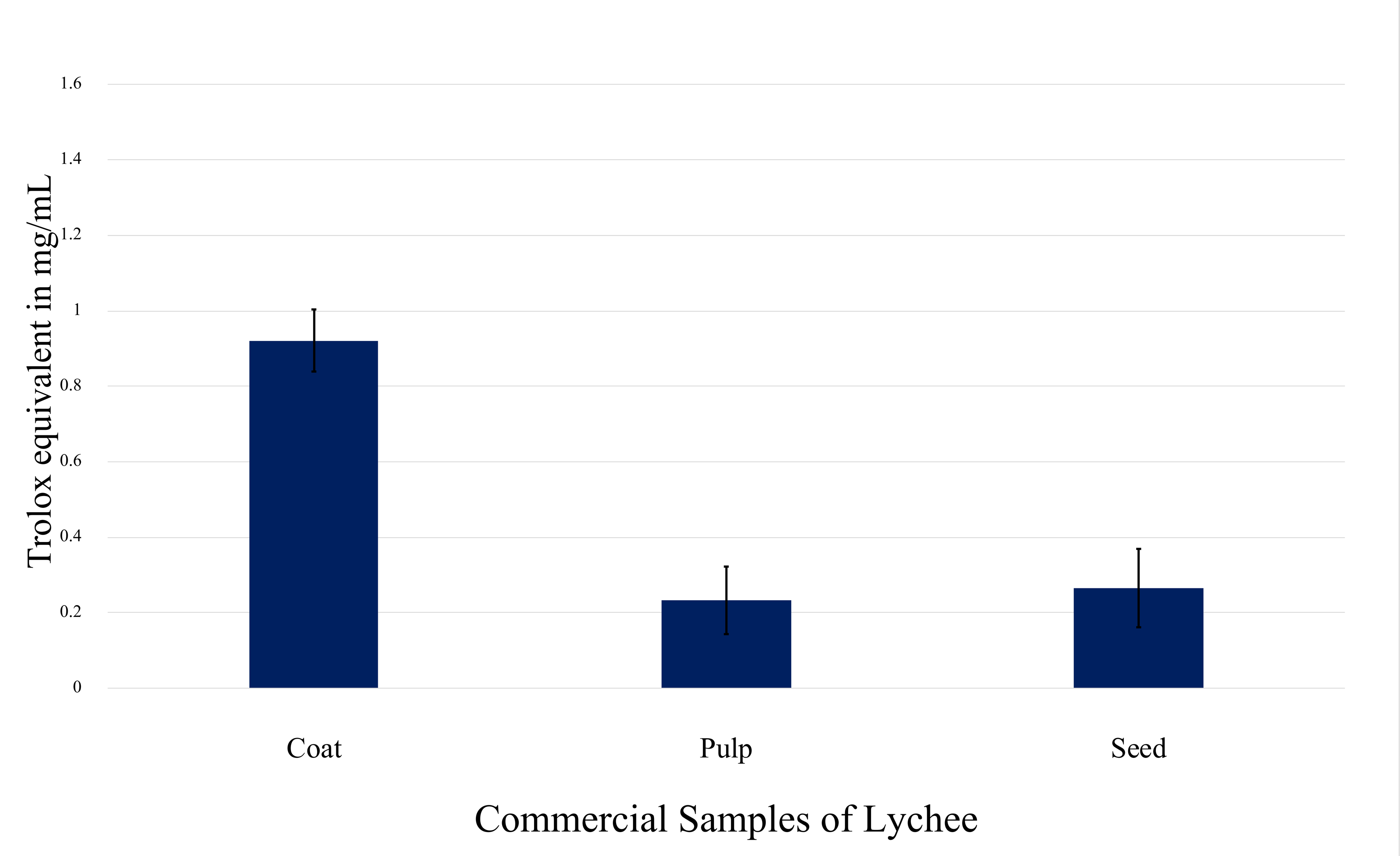

Figure 2: Antioxidant levels of the coat, pulp and seed from the Lychee. Standard error is represented by the bars present on the graph.

Discussion:

As shown in the data, the coat of the fruit reported to have the highest phenolic content (Figure 1). This remained consisted with the antioxidant levels (Figure 2). This suggests that the high level of phenolics is directly proportional to the high level of antioxidants in the fruit. Interestingly, the pulp of the fruit reported the lowest antioxidant levels (Figure 2). The pulp is usually the most consumed part of the fruit. The value reported for phenolic content of the pulp is very close to the value reported for the seed of the fruit. The seed had the lowest reported phenolic content with a slight increase in the level of antioxidants.

Conclusion:

The results from this project is useful in helping us understand the characteristics and uses of lychee. The high antioxidant levels reported in the lychee coat could be applied to counteract known free radicals. While the pulp is the most consumed part of the fruit, the results from this project may reflect that the coat should be consumed more often.

Based off this project, we plan to conduct further research in applying the extracts to human cell lines from the intestinal tract and oral cavity. Application of the extracts will involve testing for cytotoxicity and the anti-inflammatory properties of each part of the fruit. Based off the results from this project, we expect the coat to remain consistent in reporting high levels of anti-inflammatory properties as well.

References:

1. Queiroz, Estela, et al. "Bioactive phytochemicals and antioxidant activity in fresh and dried lychee fractions." Revista Ciência Agronômica, vol. 46, no. 1, Mar. 2015, pp. 163-69, doi: https://doi.org/10.1590/S1806-66902015000100019.
2. Spencer, Peter S., and Valerie S. Palmer. "The Enigma of Litchi Toxicity: An Emerging Health Concern in Southern Asia." The Lancet, vol. 5, no. 4, 30 Jan. 2017, doi:10.1016/S2214-109X (17)30046-3.