

Research Article**Phenolic content and antioxidant activity of lychee seed extract**

Daoyot Daorueang*

Department of Medical Technology, School of Allied Health Sciences, University of Phayao, Phayao Province 56000

* Correspondence to E-mail: ddaorueang@gmail.com

Naresuan Phayao J. 2019;12(2):25-27.*Received: 3 July 2019, Revised: 31 July 2019, Accepted: 15 August 2019***Abstract**

The study is aimed to investigate the total phenolic content and antioxidant activity of *Litchi chinensis* seed extract. Total phenolic content was 89.5 ± 3.7 mg GAE/g extract. The antioxidant activity of extract was performed by DPPH method. In DPPH assay, the scavenging activity on DPPH radical IC_{50} was 0.65 mg/mL while IC_{50} value of ascorbic acid was 0.16 mg/mL

Keywords: Lychee seed extract, phenolic compounds, antioxidant activity**Introduction**

Oxidative stress refers to the overproduction of reactive oxygen species (ROS) in the cell. The imbalance between free radicals and antioxidants can take part in a pathological process. Oxidative stress may result in cell damage that leading to the development of many types of chronic diseases such as diabetes mellitus (DM), cardiovascular diseases (CVDs), neurodegenerative diseases (NDGDs), and cancer. [1]

Phenolic compounds are found ubiquitously in plants as secondary metabolites. Recently, over 8,000 members of phenolic compounds have been identified. They have numerous biological activities such as antioxidant, anti-inflammation, and antibiotic property. Growing evidence from epidemiological studies, experimental studies, as well as clinical trials suggest that plant phenolic compounds can reduce the risk of chronic diseases. [2]

Lychee, an edible fruit of the Sapindaceae family, is widespread in Southeast Asia and China.

It is botanically designated as *Litchi chinensis* Sonn. [3] The fruit is known for its good taste and nutritional benefits. Other parts of lychee are also used in Chinese medicine. Modern pharmacological studies have identified that components of lychee have the effects of antioxidant, [4] anti-tumor, [3] and preventing liver injury. [5] Lychee seed is employed as an analgesic to relieve gastralgia, and neuralgia. [6] It has been reported that lychee seeds comprise the variety of chemical components such as flavonoids, saponins, amino acids and sugar. [4] The study is aimed to investigate the antioxidant phenolic compounds from lychee seeds.

Material and Method

The fresh fruits of lychee were collected from a local market. A total mass of 1,000 g of air-dried lychee seeds were ground and soaked with 2,500 mL of absolute ethanol at room temperature for approximately 48 h in the dark. The mixture was filtered through Whatman filter paper then the

residual was re-extracted by the same procedure. Both lychee seed extracts (LSE) were pooled together then evaporated and stored at -20 °C.

The Folin-Ciocalteu assay was used to determine the total phenolic content [7] which calculated and expressed as a mg of gallic acid equivalent per gram of extract (GAE/ g extract). Two independent experiments were performed then the triplicated data from each were analyzed and presented as an average value.

The free radical scavenging activity of LSE was investigated by 1,1-diphenyl-2-picrylhydrazyl radical (DPPH) [8]. In brief, the different extract concentrations of 1 mL were mixed with 3 mL of 0.2 mM DPPH methanolic solution then incubated for 30 min at room temperature in the dark. The absorbance of each sample was measured at 517 nm against a methanol control then calculated the percentage of inhibition. The antioxidant activity was presented as IC₅₀, which is calculated by plotting inhibition percentages against the concentration of the sample.

Results

The extraction yield of LSE was 4.6 g extract/100 g dried weight. The total phenolic content of LSE was 89.5 ± 3.7 mg GAE/g extract.

The LSE exhibited concentration-dependent antiradical activity by inhibiting DPPH radical with IC₅₀ value of 0.65 mg/mL while IC₅₀ value of ascorbic acid was 0.16 mg/mL.

Discussion

Usually the people used to consume the edible portion of the lychee fruit and discard the remaining pericarp and seed while they are too useful. The present study showed the potent antioxidant nature of lychee seed, the same as several studies. [9,10] Thus, the lychee seed which are commonly discarded by the people can be

used as a lead molecule that could act a potent antioxidant effect over the synthetic one.

A study in China, seventeen compounds were isolated from lychee seed. [11] The further study was suggested to determine the various compounds in Thai lychee seed and its property. Moreover, the further investigation on nutritional benefits or molecular mechanism of active compounds in Thai lychee seed should be conducted.

Acknowledgements

The author would like to thank Kannika Jaingoen and Charunee Thanawong for assistance with LSE preparation. The study was supported by a grant (Grant number RD60088), University of Phayao.

References

1. Liguori I, Russo G, Curcio F, Bulli G, Aran L, Della-Morte D, et al. Oxidative stress, aging, and diseases. *Clin Interv Aging*. 2018;13:757-772.
2. Costa C, Tsatsakis A, Mamoulakis C, Teodoro M, Briguglio G, Caruso E, et al. Current evidence on the effect of dietary polyphenols intake on chronic diseases. *Food Chem Toxicol*. 2017;110: 286-299.
3. Emanuele S, Lauricella M, Calvaruso G, D'Anneo A, Giuliano M. *Litchi chinensis* as a functional food and a source of antitumor compounds: An overview and a description of biochemical pathways. *Nutrients*. 2017;9(9):1-15.
4. Zhang J, Zhang C. Research progress on the antineoplastic pharmacological effects and mechanisms of Litchi seeds. *Chin Med*. 2015;6:20-26.
5. Chen LG, Chang CW, Tsay JG, Weng BB. Hepatoprotective effects of litchi (*Litchi chinensis*) procyanidin A2 on carbon

tetrachloride-induced liver injury in ICR mice. *Exp Ther Med.* 2017;13(6):2839-2847.

6. Ibrahim SRM, Mohamed GA. *Litchi chinensis*: Medicinal uses, phytochemistry, and pharmacology. *J Ethnopharmacol.* 2015;174: 492–513.

7. Prior RL, Wu X, Schaich K. Standardized methods for the determination of antioxidant capacity and phenolics in foods and dietary supplements. *J Agric Food Chem.* 2005;53(10): 4290-4302.

8. Molyneux P. The use of the stable free radical diphenylpicrylhydrazyl (DPPH) for estimating antioxidant activity. *Songklanakarin J Sci Technol.* 2004;26(2):211-219.

9. Shukla RK, Painuly D, Porval A, Shukla A. Proximate analysis, nutritive value, total phenolic content and antioxidant activity of *Litchi Chinensis sonn.* *Nat Prod.* 2012;8(9): 361-369.

10. Li J, Jiang Y. Litchi flavonoids: Isolation, identification and biological activity. *Molecules.* 2007;12(4):745-758.

11. Zhu XR, Wang H, Sun J, Yang B, Duan XW, Jiang YM. Pericarp and seed of litchi and logan fruits: Constituent, extraction, bioactive activity, and potential utilization. *J Zhejiang Univ_Sc B.* 2019;20(6):503-512.