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**A comparative study of the nutritional, pharmaceutical and photoprotective properties of almond (*Prunus dulcis*) and tropical almond (*Terminalia catappa*) nuts**

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This study focuses on the comparison of nutritional, pharmaceutical and photoprotective properties of methanolic extracts of *Terminalia catappa* (TC) commonly known as tropical almond or 'kottamba' and *Prunus dulcis* (PD) nuts (almond). *TC* is a popular folk medicine and has several proven biological properties. The objective of this research work was to evaluate *in vitro* antioxidant,  $\alpha$ -amylase inhibitory, anti-lipase activities, and photoprotective properties of TC and PD nuts. First, the proximate composition of powdered nuts was determined by standard methods. Next, the phytochemicals in powdered nuts were extracted to methanol by cold extraction and phytochemical screening was conducted using standard biochemical tests. Further, 2,2-Diphenyl-1-picrylhydrazyl (DPPH), 2,2'-Azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) diammonium salt (ABTS), and the ferric reducing power assays were used to determine the antioxidant activity of methanolic extracts of nuts. The  $\alpha$ -amylase inhibitory activity and anti-lipase activity of extracts were determined by  $\alpha$ -amylase inhibitory assay and anti-lipase assay respectively. Finally, the photoprotective property of the extracts was determined by a UV-Visible spectrophotometric method. Results showed that TC was significantly high in moisture (11.8%) with p value (0.00000097) less than 0.05 and low lipid content (32.16%) with p value (0.0000016) less than 0.05. There was no significant difference ( $p > 0.05$ ) recorded in crude fiber (15.66% and 14.33%) ( $p$  value = 0.2000), protein (36.15% and 33.85) ( $p$  value = 0.2298), and carbohydrate (11.85% and 12.23%) ( $p$  value = 0.2690) for TC and PD, respectively. The present study revealed that both nuts are rich in phenols, alkaloids, flavonoids, steroids, terpenoids, glycerides, saponin, cardiac glycosides and triterpenes. PD extract showed significantly higher DPPH radical scavenging activity with an  $IC_{50}$  value of  $78.55 \pm 5.10$   $\mu\text{g/mL}$  while TC extract showed an  $IC_{50}$  of  $89.22 \pm 4.40$   $\mu\text{g/mL}$ . The ABTS radical scavenging activity of PD, with a value of  $IC_{50}$   $57.19 \pm 0.32$   $\mu\text{g/mL}$  is significantly higher than that of TC, ( $IC_{50}$   $74.36 \pm 3.34$   $\mu\text{g/mL}$ ). The ferric reducing power of TC (FRAP values of  $41.6 \pm 0.23$  mg potassium ferricyanide equivalents per gram (PFE/g) of dried extracts) is significantly lower than that of PD ( $39.15 \pm 0.21$  mg PFE/g of dried extracts). The  $\alpha$ -amylase inhibitory experiment demonstrated that the extracts of TC with an  $IC_{50}$   $113.4 \pm 1.56$   $\mu\text{g/mL}$  and PD with  $IC_{50}$   $128.3 \pm 1.12$   $\mu\text{g/mL}$  have inhibitory effects on the enzyme. In the anti-lipase assay, both samples showed anti-lipase activity (TC -  $190.4 \pm 5.22$   $\mu\text{g/mL}$ , and PD,  $167.33 \pm 6.35$   $\mu\text{g/mL}$ ) indicating their potential to block the lipase enzyme, which aids in weight reduction. Compared to a commercially available sunscreen, both extracts exhibited moderate UV protection with SPF values of  $14.52 \pm 2.34$  (TC) and  $12.92 \pm 1.78$  (PD). These results suggested that not only PD, but also TC nuts are a great source of antioxidants, anti-diabetics, and anti-obesity compounds despite not being commercially utilized. Therefore, *Terminalia catappa* can be used as an alternative to *Prunus dulcis* in food and pharmaceuticals.

**Keywords:** Antioxidant, Anti-diabetic, Anti-lipase, Photoprotective

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