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**Exploration of antioxidant activity and photoprotective potential of methanolic extract of *Ananas comosus* (Pineapple) peel**

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Pineapple (*Ananas comosus*) is known to be rich in phytochemicals with antioxidant and antimicrobial activities. As less research has been conducted to investigate the bioactivity of its peels, the present study aimed to evaluate the antioxidant activity and photo-protective property of methanolic extract of pineapple peel to investigate its potential to be used as a natural source of cosmeceutical sunscreen agents. Pineapples at full ripeness stage were purchased and the chemical constituents of dried and powdered pineapple peels (20.00 g) extracted into methanol by Soxhlet extraction were sequentially partitioned into hexane, dichloromethane and aqueous methanol (50%). The antioxidant activity of each fraction was determined by  $\alpha$ -diphenyl- $\beta$ -picrylhydrazyl (DPPH) free radical assay. Total phenolic content (TPC) and total flavonoid content (TFC) of methanolic extract and its fractions were assessed by Folin-Ciocalteu and aluminium chloride colorimetric assays respectively. The photo-protective potential of the fractions was evaluated by determining the Sun Protection Factor (SPF) of each fraction using the Mansur equation. All the tests were conducted in triplicates. The aqueous methanol fraction showed the highest DPPH free radical scavenging activity with  $IC_{50}$  value of  $85.704 \pm 0.09$   $\mu$ g/mL and the highest TPC of  $41.780 \pm 0.223$  mg Gallic acid equivalent /g dry weight of plant material. Dichloromethane fraction was rich in flavonoids with TFC of  $31.372 \pm 0.996$  mg Catechin equivalent/g dry weight of pineapple peel. All the fractions of methanolic extract of pineapple peel exhibited UV-B absorption and among them, dichloromethane fraction showed significantly high photo protective properties with an SPF of  $29.74 \pm 0.03$  at 1 mg/mL while the SPF of the reference photo-protective agent, benzophenone was  $13.75 \pm 0.01$  at 1 mg/mL. Aqueous methanol was found to be the most photo-stable after irradiation with direct solar radiation for 21 days. The results suggest that the extract of peels of pineapple could be incorporated into sunscreen formulation as a source rich in phytochemicals with potential antioxidant and photo-protective properties.

**Keywords:** Antioxidant, Photo-protective, Phytochemicals, Sunscreen

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