



Research Article

Peel of pineapple (*Ananas comosus*) as a potential source of antioxidants and photo-protective agents for sun protection cosmetics

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ABSTRACT

The present study was aimed to evaluate the antioxidant activity and photo-protective property of methanolic extract of pineapple peel to study its potential as a natural source in sun protection cosmeceutical products. The chemical constituents of dried and powdered pineapple peels extracted into methanol by soxhlet extraction were sequentially partitioned into hexane, dichloromethane (DCM) and aqueous methanol (50%). The 50% methanol fraction was found to be rich in phytochemicals with antioxidant activity with IC_{50} value of $85.70 \pm 0.09 \mu\text{g/mL}$ and the total phenolic content of $208.899 \pm 9.388 \text{ mg gallic acid equivalent (GAE) / kg dry weight of plant material}$. DCM fraction was rich in flavonoids with total flavonoid content of $79.913 \pm 2.491 \text{ mg catechin (CAT) equivalent / kg dry weight of pineapple peel}$. All the fractions of the pineapple peel were exhibited UV – B protection ability and DCM fraction was consisted with an impressive photo-protective property with the Sun Protection Factor (SPF) of 29.74 ± 0.03 at 1 mg/mL . The aqueous methanol fraction was found to be the most photo-stable after irradiation with direct solar radiation for 21 days. Pearson's correlation revealed that there is a very strong positive correlation between SPF and TFC ($r = 0.9497$) and a strong positive correlation between SPF and TPC ($r = 0.6366$). Since the DCM fraction was rich in compounds with photo-protective properties it was further separated by silica gel column chromatography and analyzed by GC-MS for volatile compounds. The results revealed that the DCM fraction was rich in bioactive compounds with known antioxidant activities indicating the possibility of using pineapple peel to develop natural sunscreen formulations with antioxidant properties.

Keywords: Antioxidant, correlation, pineapple, phytochemicals, sun protection factor

Abbreviations: **BHT:** Butylated hydroxy toluene, **CAT:** catechin, **DCM:** Dichloromethane, **DPPH -** α -diphenyl- β -picrylhydrazyl, **GAE:** Gallic Acid Equivalents, **GC-MS:** Gas Chromatography - Mass Spectrometry, **IC_{50} :** Sample concentration which gives 50% inhibition, **NIST:** National Institute of Standard and Technology, **SD:** Standard Deviation, **SPF:** Sun Protection Factor, **TFC:** Total Flavonoid Content, **TPC:** Total Phenolic Content, **% inhibition:** Percent inhibition.

INTRODUCTION

Pineapple (*Ananas comosus*) is one of the most important tropical fruits in the world and has a worldwide business. Pineapple fruit has medicinal values. Ripe fruit possesses germicidal, laxative and invigorative properties, and it

contains digestive enzymes which increase appetite and also useful in treating cardiovascular disorders (Lobo and Paull, 2017). Further, it has anti-oxidant, anti-cancer and anti-inflammatory properties (Diogo *et al.*, 2013). High bromelain content of pineapple is beneficial for arthritis or joint pains. It also prevents the formation of blood clots.

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