ABSTRACT

Coconut cake (CC) is the by-product of coconut oil manufacturing process which is rich in antioxidants. There is very little information on the antioxidant activity of CC in biological systems. In this study, the correlation of antioxidant activity of CC with biological and chemical systems was monitored. Ethanol: water 70: 30 (v/v) was used to extract phenolic compounds and that extract is denoted as CCPE. The total phenolic content was 1892±51 GAE mg/kg dry weight and *o*-diphenol content was 591±48 CAE/kg dry weight. The percentage of ferric reducing power and DPPH radical scavenging activity of CCPE increased with increasing concentrations. Those antioxidant activities are comparable to gallic acid (GA). HPLC system was used to identify and quantify the total polyphenols present in CCPE. GA is the prominent polyphenol compound while syringic acid is the least abundant. The effect of CCPE on deoxyribose degradation and protein carbonylation showed comparable antioxidant activity to GA. Further, CCPE has the ability to prevent DNA damage *in -vitr*o. HEp-2 human epithelial cells were used as the biological system to measure the antioxidant activity of CCPE. CCPE significantly ($P \leq 0.05$) inhibited MDA formation, protein carbonyl formation and mt-DNA damage in HEp-2 cells. The amount of oxidized glutathione decreased resulting in a significantly ($P \leq 0.05$) increased GSH/GSSG ratio upon treatment with CCPE. Further, CCPE resulted in no significant change in GPx expression compared to the unstressed cells. Therefore, CCPE can inhibit oxidative stress-induced macromolecular damage on carbohydrate, protein, lipid and DNA in both chemical and biological systems and the protective effect does not appear to result from a change in the level of expression in the oxidative stress response genes.

Key words: Coconut cake, Antioxidants, Oxidative stress, Macro molecular damage, *In-vitr*o and *in-vivo* systems