

4th World Congress on
MEDICINAL PLANTS & NATURAL PRODUCTS RESEARCH AND
12th GLOBAL ETHNOMEDICINE & ETHNOPHARMACOLOGY CONFERENCE
August 08-09, 2018 Osaka, Japan

Phenolic content, anti-aging and cytotoxicity activities of cocoa bean extract for a potential use in cosmeceuticals

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State of the Problem: Severe skin injuries due to extensive use of synthetic antioxidants in cosmetic formulas have been reported endlessly. Therefore, recent trend in anti-aging cosmeceuticals is projecting on the use of natural antioxidant derivatives from plants. The present study evaluates potential use of Cocoa Bean Extract (CBE) as a cosmeceutical ingredient, with significant number of phenolic compounds in arrays of biochemical assays.

Materials & Methods: Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) of two potential cocoa clones, i.e. PBC 123 and PBC 140, were assessed by Folin-Ciocalteu reagent and aluminium chloride (AlCl₃) using gallic acid and rutin as standards, respectively. Anti-tyrosinase was measured using mushroom tyrosinase with kojic acid as a standard whereas anti-collagenase was assayed using synthetic chromogenic substrate, i.e. Ac-PLG-(2-mercapto-4-methyl-pentanoyl)-LG-OC₂H₅ (MMPLO). The 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide (MTT) assay for cytotoxicity study was conducted on Human Dermal Fibroblasts, adult (HDFa) cell line to ascertain its non-toxic nature.

Results & Discussion: The TPC of PBC 123 and 140 were 119.55±2.96 and 116.98±1.19 mg GAE/g DW, respectively whereas TFC values of the respective clones were 75.47±1.77 and 72.29±0.84 mg RE/g DW with no significant different ($p>0.05$). In terms of tyrosinase inhibition, PBC 140 and PBC 123 were not significantly different with IC₅₀ values 200.00 and 300.00 µg/mL ($p>0.05$), respectively whereas the inhibition of collagenase effect was not significantly different ($p>0.05$) as well for PBC 140 (62.99%) and PBC 123 (59.96%). A strong and positive correlation ($p>0.05$) was observed between TPC and TFC ($r=0.866$), anti-tyrosinase ($r=0.963$) and anti-collagenase ($r=0.909$), anti-tyrosinase and anti-collagenase ($r=0.936$) whilst TFC correlates well with anti-tyrosinase ($r=0.865$) and anti-collagenase ($r=0.868$). The CBE was not cytotoxic against human fibroblasts at a concentration up to 937.50±6.50 µg/mL.

Conclusion: The findings exhibited a strong correlation between anti-aging and phenolic contents. In addition, the CBE showed non-toxic effect against HDFa.

Biography

Norliza Abdul Wahab is currently pursuing her PhD at Halal Products Research Institute, University Putra Malaysia, Serdang in a Halal Products Development Program. She is also working as a Research Officer of Malaysian Cocoa Board, a government organization for more than 16 years mainly in cocoa-based cosmetic products development.

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