Comparison of ABTS, DPPH, and FRAP Assays for Estimating Antioxidant Potential of Selected Sri Lankan Traditional Sweetmeats

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Fifteen Sri Lankan traditional sweetmeats (Hendi kewum, Beraliya kewum, Naran kewum, Athirasa, Mung kewum, Aasmi, Kokis, Undu walalu, Welithalapa, Bedihaalpiti aggala, Dodol, Aluwa, Thala guli, Kurahan helapa and Pusnambu) were investigated for antioxidant potential (AP) by 2,2-diphenyl-1- picrylhydrazyl assay (DPPH), 2,2-azino-bis-3-ethylbenzothiazoline-6-sulphonic acid (ABTS) assay and Ferrous reducing antioxidant power assay (FRAP). Total phenolic content (TPC) and total flavonoid content (TFC) of sweetmeats were determined by using colorimetric assays. Lyophilized sweetmeats (1:10) were used to prepare 80% methanolic extractions at room temperature for 24 hours for all the assays. Helapa was further investigated for the changes in AP with the changes of ingredients utilized in different regions of Sri Lanka. Accordingly, Helapa prepared with 100% finger millet flour, finger millet+rice flour, Shorea megistophylla (sin. Beraliya) flour+rice flour, Vateria copallifera (sin. Hal) flour+rice flour, Madhuca longifolia (sin. Mee) flour+rice flour was studied. Results revealed that, among sweetmeats examined for AP, Naran Kewum showed the significantly highest AP (1595.7±0.03 µg/mL TE) by FRAP assay and Helapa showed the highest radical scavenging activity for DPPH (564.8± 0.02 µg/mL TE) and ABTS (553.2±0.01 µg/mL TE) assays ($p<0.05$). Naran Kewum showed the significantly highest TPC (293.44 GAE/100 g) and TFC (237.8±0.34 QE/100g). In addition, rice flour mixed with Shorea megistophylla flour in preparation of Helapa had the highest TPC (316.9±0.28 GAE/100 g), the highest radical scavenging activity for DPPH (541.6±0.67 µg/mL TE) and ABTS (502.6±0.21 µg/mL TE) assays ($p<0.05$) with compared to other ingredients added Helapa. These AP may be due to stable polyphenolics at high temperatures and newly formulated molecules by Maillard reaction. It is apparent that, Sri Lankan traditional sweetmeats had significant AP which are related with positive health benefits.

Keywords: Traditional sweetmeats, Antioxidant potential, Phenolic content, Health benefits