Abstract No: BO-46

Evaluation and comparison of antioxidant properties and total phenolic content of pomegranate (*Punica granatum L.*) peel and juice

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Pomegranate peel is currently a waste but contains valuable, rich with a diverse range of bioactive compounds. The objective of the present study was to assess the antioxidant properties by IC_{50} value and FRAP value, total phenolic content (TPC), total flavonoid content (TFC) and total anthocyanin content (TAC) of the peel (PP) and the juice (PJ) of local pomegranate cultivars, *Nayana, Nimali* and *Kalpitya red*. Antioxidant properties were tested by FRAP and DPPH assay. TPC was measured spectrophotometrically using the Folin Ciocalteu method and expressed as mg Gallic acid equivalents (GAE)/gram. TFC was evaluated by the aluminum chloride assay. TAC was detected by the vanillin assay. The TAC and TFC of PP of *Nimali, Nayana and Kalpitya red* cultivars were 22.12 ± 0.20, 49.05 ± 0.30 and 69.08 ± 0.57 mg catechin equivalents (CE)/g and 67.67 ± 0.59, 59.58 ± 0.85 and 75.99 ± 0.85 mg rutin equivalent (RE)/g respectively. The TAC of PJ ranged from 0.40 ± 0.01 to 2.82 ± 0.03 mg CE/g was nearly 60 times less than that of PP of the same cultivar. The TFC of PJ ranged from 0.39 ± 0.00 to 0.80 ± 0.00 mg RE/g was nearly 100 times less than that of PP. The TPC and FRAP values of PP of *Nimali, Nayana* and *Kalpitya red* cultivars were 469.67 ± 8.97, 413.92 ± 4.75 and 318.82 ± 4.66 mg GAE/g and 6690.00 ± 153.00, 4270.60 ± 83.00 and 4512.00 ± 14.00 μmol Fe^{2+}/g respectively. The TPC of PJ varied from 0.87 ± 0.02 to 1.98 ± 0.04 mg GAE/g was nearly 300 times less than that of PP. The FRAP values of PJ ranged from 15.57 ± 0.36 to 40.18 ± 0.29 μmol Fe^{2+}/g were nearly 200 times less than that of PP. The IC_{50} values of PP of *Nimali, Nayana* and *Kalpitya red* cultivars were found to be 14.20, 20.40 and 18.00 μg/mL respectively. The IC_{50} values of PJ were in the range of 915-3098 μg/mL, nearly 100 times higher than that of PP. The results revealed that PP contains exceptionally high TPC and antioxidant properties observed by IC_{50} and FRAP values with respect to PJ of the same cultivar. The PP of *Nimali* cultivar had the highest antioxidant properties and TPC. The PP of *Kalpitiya red* cultivar possessed the highest TFC and TAC. Thus, PP has a high potential to be utilized as a resource of bioactive compounds. The results proved that there is no correlation between phenolic compounds and the antioxidant properties. All the parameters tested were significantly different ($p<0.05$) among the cultivars.

Keywords: Pomegranate peel**,** Antioxidant properties, Total phenolic content, Total flavonoid content and Total anthocyanin content

Acknowledgement
The authors thank Agriculture Research Station, Kalpitiya for providing pomegranate samples.