

Effect of Different Blanching Methods on Antioxidant Properties of Selected Green Leafy Vegetables

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Green leafy vegetables are less expensive, yet rich in myriad of phytochemicals having antioxidant properties. Blanching is a prerequisite for preservation of green leafy vegetables to prevent the activity of phenolases during storage. The objective of this study was to determine the effect of two blanching methods (steam and hot water) on three green leafy vegetables, namely, Moringa (*Moringa oleifera*), Amaranthus (*Amaranthus viridis*) and Centella (*Centella asiatica*). The antioxidant properties were evaluated in terms of total phenolic content (TPC), total flavonoids content (TFC), total antioxidant capacity and antioxidant activity [2, 2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity]. The DPPH radical scavenging activity was expressed as IC₅₀ value, which is inversely proportional to antioxidant activity. The TPC, TFC and antioxidant capacity were measured using the Folin-Ciocalteu method, aluminium chloride method and phosphomolybdenum assay, respectively. Antioxidant contents of fresh and blanched leaves were extracted using methanol (80 %, v/v). All experiments were carried out in triplicates and the results were analyzed by one way analysis of variance (ANOVA) using SAS. Results revealed that TPC and TFC of fresh Moringa, Amaranthus and Centella leaves were 20.43±0.71, 15.56±2.15 and 19.04±0.16 mg GAE/g of DW and 7.06±2.24, 3.68±1.06 and 4.63±0.59 mg CE/g DW, respectively. The antioxidant capacity of fresh leaves of Moringa, Amaranthus and Centella were 45.64±4.51, 29.03±1.41 and 30.35±0.84 mg AAE/g DW, respectively. All three leaves blanched by both methods contained significantly ($p<0.05$) less TPC and TFC than fresh leaves except TFC of Amaranthus and antioxidant capacity of Moringa. Hot water blanching caused significantly ($p<0.05$) higher losses in TPC of Moringa, TFC of Amaranthus and Centella and antioxidant capacity of Moringa and Amaranthus leaves than steam blanching. The IC₅₀ value of fresh Moringa, Amaranthus and Centella leaves were 85.56±16.93, 244.76±55.74 and 165.53±29.79 µg/mL, respectively. All blanched leaves showed significantly ($p<0.05$) less antioxidant activity than fresh leaves. The IC₅₀ values of all steam blanched leaves were significantly ($p<0.05$) less than hot water blanched leaves, that is, the antioxidant activity of steam blanched leaves is higher than hot water blanched leaves. In addition, the correlation analysis of the results revealed that there is a strong positive correlation between the total phenolic contents and total antioxidant capacity ($r=0.79$) as well as between the total flavonoid contents and total antioxidant capacity ($r=0.88$). Based on this study, it can be concluded that, both blanching methods causes losses in antioxidant activities, however, the losses are less in steam blanching than hot water blanching. Therefore, steam blanching could be recommended for the selected leafy vegetables to retain higher level of antioxidant properties before further preservation such as drying.

Keywords: Antioxidant, blanching, green leafy vegetables, total flavonoid content, total phenolic content

Abbreviations: DW: dry weight; GAE: gallic acid equivalent; CE: catechin equivalent; AAE: ascorbic acid equivalent