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Food processing and human health

Watermelon juice concentrate

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Production of watermelon is in great amount in Iran during summer time. Consumption of this fruit is recommended by health and nutrition authorities. Findings from USDA scientists indicate that watermelon contains high levels of lycopene - an antioxidant that may help the body fight against cancer and other chronic diseases. Thus it can be considered as a functional food – one that may help prevent certain diseases. However, production of this fruit in some parts of the country is in excess of its consumption, so large amounts are spoiled and wasted. Therefore, in this study we tried to process two kinds of watermelons and to formulate their juice and concentrate which preserves its flavor, appearance and nutrient contents. Seventy two Charleston Gray and local variety of Khorasan watermelon samples were analyzed. Water content of local watermelon and Charleston Gray were $55.9\% \pm 3.1$ and $58\% \pm 1.12$ respectively, rind $34.3\% \pm 0.7$ and $31.8\% \pm 1.56$ (N.S), seeds $4.8\% \pm 1.29$ and $2.3\% \pm 0.32$ ($P < 0.002$) and pulps were $4.9\% \pm 1/39$ and $7.9\% \pm 0.45$ ($P < 0.001$). Sixty different formulae from a mixture of watermelon juice and food additives (30 formulae of each variety) were prepared and their organoleptic characteristics underwent preliminary investigation by category scale. Three formulae from each variety were selected (A, B and C) and their organoleptic characteristics were evaluated. The suitable formula for each variety was nominated by test panel. The formula A of Charleston Gray variety including 100ml juice, 4g sugar and 0.1g citric acid with 68.3% acceptability and the formula B of local variety including 100ml juice, 5g sugar and 0.2 g citric acid with 30.4 % acceptability were selected as preferred samples. The selected formula of Charleston Gray variety was concentrated (up to Brix 54) and packed. Changes of chemical, microbial and organoleptic characteristics in different condition (room, refrigerator and freezer) during 0, 15, 30, 45, ... 90 days storage were determined. Ninety days storage in different temperatures did not cause notable changes of chemical, microbial and organoleptic characteristics.

Influence of cooking practice on antioxidant properties and phenolic content of selected vegetables

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Green leafy vegetables, fruits, legumes and vegetable oils are excellent sources of antioxidant components. In Asian countries, most of vegetables undergo cooking process rather than eaten raw. Cooking practices may affect the antioxidant content and properties in vegetables. Therefore, this study was carried out to determine the effect of cooking practice (blanching) on antioxidant properties (total antioxidant and free radical scavenging activities) and total phenolic content of selected cruciferous vegetables. The total antioxidant and free radical scavenging activities, and the total phenolic content of the fresh and blanched vegetables were determined using β -carotene bleaching, DPPH free radical scavenging and Folin-Ciocalteu methods, respectively. Red cabbage, Chinese cabbage, cabbage, mustard cabbage and Chinese white cabbage were used in this study. The results indicated that red cabbage and mustard cabbage had the highest total antioxidant activity, while Chinese white cabbage and red cabbage had the highest free radical scavenging activity. Red cabbage had the highest total phenolic content among all the tested fresh vegetables. The loss of total antioxidant activity was highest in Chinese cabbage (40%) after 15 min of blanching followed by red cabbage (28%), cabbage (27%), Chinese white cabbage (19%) and mustard cabbage (9%). Red cabbage had lost a total of 40% scavenging activity, followed by Chinese cabbage (38%), cabbage (36%), mustard cabbage (23%) and Chinese white cabbage (11%). Except for cabbage and mustard cabbage, this study revealed that 10 min blanching time had significant effect ($p < 0.05$) on the antioxidant properties and phenolic content of all vegetables studied. However, only Chinese cabbage showed an increase ($p < 0.05$) in total phenolic content after 15 min of blanching compared to other vegetables. In conclusion, minimal heat treatment through blanching process is recommended to prevent the major loss of antioxidant properties and phenolic content for selected cruciferous vegetables.