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Aronia berry based new food products and shelf life stability studies

The consumption of low levels of antioxidants in the form of fruit and vegetables has been shown to more than double the incidence of certain cancers. Tea is popular beverage and currently, herbal infusions based on dried fruit products have gained in popularity because of their fragrance, fruity flavor, lower amounts of caffeine, and low astringent and bitter taste. Chemical composition and biological activity of berries and their products have been widely reported but there are limited works dealing with berry fruit teas. Powder forms of berries and industrial ice-cream form of berries are also utilized as functional food products for nutrition. The genus *Aronia* (Rosaceae family) includes two species of shrubs, native to eastern North America and Eastern Canada: *Aronia melanocarpa* (Michx.) Ell., known as black chokeberry and *Aronia arbutifolia* (L.) Pers. (red chokeberry). The aronia berries contain high levels of flavonoids, mostly proanthocyanidins and anthocyanins, and *in vitro* and *in vivo* studies indicate that the berries may have potential health benefits, e.g. hepatoprotective effects, cardioprotective effects, antidiabetes effect and anticancer effects on selected CACells. Aronia berry [*Aronia melanocarpa* (Michx.)] (black chokeberry) was harvested at Yalova Research Institute, Yalova, Turkey. After harvesting, the content of total polyphenols of fresh aronia berry was 1012.67 ± 34.62 mg GAE/100 ml ($n=3$) and the monomeric anthocyanin level was 425.65 ± 3.65 mg/100 ml ($n=3$). In our current research, aronia based new products including aronia berry teas (as decoction and infusion types), aronia powder and aronia ice-cream were developed by Dokuz Eylul University Technology Development Zone Depark Technopark Spil Innova LLC, Izmir Project. Aronia berry (black chokeberry) fruit teas was found as valuable source of flavonoids and anthocyanins compared to the most of commonly consumed berry teas. In manufacturing, decoction method was applied by boiling of aronia berry material in a non-aluminum pot during 8 min until up to two-thirds of the water was evaporated and was strained by home-made tea strain apparatus. Total concentration of phenolics for decoction was evaluated by Folin-Ciocalteu method at 765 nm of absorbance and total phenolics was found as 87.72 ± 0.83 mg GAE/100 ml ($n=3$) whereas total anthocyanin content was measured according to European Pharmacopoeia 6.0 method with slight modifications. The percentage content of anthocyanins, expressed as cyanidin-3-glucoside chloride was calculated from the expression: $A \times 5000/718 \times m$ (A =absorbance at 528 m; 718=specific absorbance of cyanidin-3-glucoside chloride at 528 nm; m =mass of the tea to be examined in grams) and was found as 8.87 ± 0.03 mg/100 ml ($n=3$). In the study, aronia tea infusion was also carried out. Infusion means achieving a desired taste and aroma results of aronia berry by dissolving a certain proportion of the tea materials into water. This application was performed by using a certain combination of teaware, steeping process, water temperature, water to aronia berry tea ratio. The total phenolics and the anthocyanin level of infusion was determined as 101.02 ± 0.55 mg GAE/100 ml ($n=3$) and 9.05 ± 0.05 mg/100 ml ($n=3$), respectively. For aronia (chokeberry) powder production, aronia berries were subjected to freeze drying (FD) and spray drying process (B-290, Buchi Labour Technik, AG, Flawil, Switzerland) based on our determined conditions; the content of total polyphenols in aronia powder product was 444.72 ± 4.33 mg GAE/100 ml ($n=3$) whereas the anthocyanin level of powder was 151.30 ± 1.53 mg/100 ml ($n=3$). In the study content, ice-cream with aronia berry (aronia ice-cream) was also manufactured by industrial ice-cream procedure with pasteurization and by using emulgators and stabilizers at Piramit Ice-Cream Company. The content of total polyphenols in pasteurized aronia berry pulp, in aronia ice-cream, and in control ice-cream were found as 676.48 ± 16.86 mg GAE/100 ml ($n=3$), 69.06 ± 7.75 mg GAE/100 ml ($n=3$) and 0.79 ± 0.17 mg GAE/100 ml ($n=3$), respectively. The level of the anthocyanin in pasteurized aronia berry pulp, in aronia ice-cream, and control ice-cream were detected as 312.24 ± 5.82 mg/100 ml ($n=3$), 44.59 ± 1.83 mg/100 ml ($n=3$) and 0.00 ± 0.00 mg/100 ml ($n=3$), respectively. Aronia berry based new nutritive food products could be utilized in functional food industry as valuable antioxidant sources and could be evaluated as innovative foods.

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Biography

Tokusoglu has completed her PhD at Ege University Engineering Faculty, Dept of Food Engineering at 2001. She is currently working as Associate Professor Dr faculty member in Celal Bayar University Engineering Faculty Department of Food Engineering. Tokusoglu performed a visiting scholar at the Food Science and Nutrition Department /University of Florida, Gainesville-Florida-USA during 1999-2000 and as visiting professor at the School of Food Science, Washington State University, Pullman, Washington, USA during April-May 2010. She has published many papers in peer reviewed journals and serving as an editorial board member of selected journals. Tokusoglu published the scientific edited three international books entitled Fruit and Cereal Bioactives: Chemistry, Sources and Applications and entitled Improved Food Quality with Novel Food Processing by CRC Press, Taylor & Francis, USA Publisher, as third book Food By-Product Based Functional Food Powders by CRC Press, too; Dr Tokusoglu also published three national books entitled Cacao and Chocolate Science and Technology, Special Fruit Olive: Chemistry, Quality and Technology and third one as Frying Oils Science and Technology. She organized and/or administered as Conference Chair and Group Chair of Food and Nutrition at many conferences and congress in different continental countries as majorly in USA, Canada, Europe and Asia Pasific

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