

Effects of Ultraviolet Treatment on Microbiological Load and Phenolic Content of Vegetable Juice

Authors : Kubra Dogan, Fatih Tornuk

Abstract : Due to increasing consumer demand for the high-quality food products and awareness regarding the health benefits of different nutrients in food minimal processing becomes more popular in modern food preservation. To date, heat treatment is often used for inactivation of spoilage microorganisms in foods. However, it may cause significant changes in the quality and nutritional properties of food. In order to overcome the detrimental effects of heat treatment, several alternatives of non-thermal microbial inactivation processes have been investigated. Ultraviolet (UV) inactivation is a promising and feasible method for better quality and longer shelf life as an alternative to heat treatment, which aims to inhibit spoilage and pathogenic microorganisms and to inactivate the enzymes in vegetable juice production. UV-C is a sub-class of UV treatment which shows the highest microcidal effect between 250-270 nm. The wavelength of 254 nm is used for the surface disinfection of certain liquid food products such as vegetable juice. Effects of UV-C treatment on microbiological load and quality parameter of vegetable juice which is a mix of celery, carrot, lemon and orange was investigated. Our results showed that storing of UV-C applied vegetable juice for three months, reduced the count of TMAB by 3.5 log cfu/g and yeast-mold by 2 log cfu/g compared to control sample. Total phenolic content was found to be 514.3 ± 0.6 mg gallic acid equivalent/L, and there wasn't a significant difference compared to control. The present work suggests that UV-C treatment is an alternative method for disinfection of vegetable juice since it enables adequate microbial inactivation, longer shelf life and has minimal effect on degradation of quality parameters of vegetable juice.

Keywords : heat treatment, phenolic content, shelf life, ultraviolet (UV-C), vegetable juice

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