

Abstract

Influence of Freezing Methods on the Quality Parameters of Frozen Globe Artichokes [†]

Beyzanur Bayraktar ^{*✉}, Ahmet Görgüç, Kardelen Demirci and Fatih Mehmet Yılmaz

Food Engineering Department, Engineering Faculty, Aydın Adnan Menderes University, 09010-Efeler, Aydın, Türkiye; ahmet.gorguc@adu.edu.tr (A.G.); kardelenemirci@gmail.com (K.D.); fatih.yilmaz@adu.edu.tr (F.M.Y.)

* Correspondence: beyzanurbayraktar3550@gmail.com

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Abstract: The edible parts of artichokes (*Cynara scolymus* L.) are usually preserved in brine due to the short harvest season; however, this is less preferred by both retail sales and the catering sector since the high amount of salt is harmful to health. Freezing is an alternative method in terms of providing longer shelf life. The final quality of frozen foods can vary with the rate of freezing and the structure, size and distribution of ice crystals formed during the freezing process. The formed ice crystals directly affect the cellular structure and thus resilience of the overall tissue. The aim of this study was to compare the effects of three different freezing methods, i.e., static, air-blast and individual quick freezing (IQF), on the quality characteristics of globe artichokes. In this context, globe artichokes were frozen until reaching a center temperature of $-20\text{ }^{\circ}\text{C}$, then thawed at $4\text{ }^{\circ}\text{C}$ to analyze the amount of ascorbic acid, total phenolic content, antioxidant capacity (with DPPH and ABTS method), color difference value, texture and microstructure. The findings showed that a moderate quick-freezing method or air-blast resulted in the most-conserved DPPH antioxidant capacity result. While the total phenolic content and hardness values were the lowest in static frozen samples, the ascorbic acid was found to be highest in this method. No significant difference was evidenced in the color difference values of the samples ($\Delta E = 7.9\text{--}8.4$). When the microstructures were examined, larger ice crystals were formed in the static frozen artichoke samples, followed by the air-blast and IQF processes. It can be concluded that smaller and homogeneously dispersed ice crystals in the artichoke samples frozen by IQF could better preserve the cellular structure.



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