

Abstract

The Effect of Sodium Metabisulfite Dipping Pretreatment on the Selected Quality Parameters of Apple Snacks [†]

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[†] Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Apple chips, which are in the snack product category, are the forefront of research due to their nutritional value and high fiber and low fat contents. Sodium metabisulfite (E223) is widely used in the food industry to prevent the browning reactions that occur during drying processes. Sodium metabisulfite ($\text{Na}_2\text{S}_2\text{O}_5$) is a powder that is easy and safe to use, is highly accessible and is also inexpensive in terms of cost. However, in recent years, industry and academia have focused on reducing the sulfur dioxide concentration in foods. The objective of this study was to investigate the effect of sodium metabisulfite as a pretreatment on the bioactive and technological properties of apple chips using an air-circulated tray dryer. In this context, apple discs were immersed in $\text{Na}_2\text{S}_2\text{O}_5$ solutions prepared at three different concentrations (0.02, 0.1 and 0.5%), and then drying was carried out at 55 °C and 1.5 m/s air flow rates. The apple chips were also produced out of unpretreated discs using both a tray dryer and freeze dryer. The differences among the sample groups were compared by performing browning index, water activity, rehydration rate, total phenolic content and antioxidant capacity analyses. The findings showed that water activity (aw) values of the apple chips (0.28–0.32) were within reliable limits in terms of storage stability and shelf life. There was no significant difference between the aw values of the apple chips produced using different $\text{Na}_2\text{S}_2\text{O}_5$ concentrations, but the apple chips produced through the freeze-drying had the lowest aw value. The increasing concentration of $\text{Na}_2\text{S}_2\text{O}_5$ gradually increased the rehydration ratio of the chips produced in the tray dryer. On the other hand, the chips produced with the freeze dryer had significantly higher rehydration ratio (4.3) due to the porous structure. The browning index values of the chips gradually decreased with the increase in $\text{Na}_2\text{S}_2\text{O}_5$ concentration. Freeze-drying resulted in a higher conserved total phenolic content and antioxidant capacity value. Still, the $\text{Na}_2\text{S}_2\text{O}_5$ pretreatment also protected the bioactive components of the products when compared with those of the untreated apple discs.

Keywords: apple chips; drying; fruit quality; dipping pretreatment; sodium metabisulfite

Citation: Yılmaz, F.M.; Bozkurt, S.; Görgüç, A.; Erdoğan, Ö.; Yaman, H.; Kurumaz, S. The Effect of Sodium Metabisulfite Dipping Pretreatment on the Selected Quality Parameters of Apple Snacks. *Proceedings* **2023**, *91*, 271. <https://doi.org/10.3390/proceedings2023091271>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 5 February 2024



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Author Contributions: Conceptualization, F.M.Y.; methodology, F.M.Y., S.B., A.G. and Ö.E.; formal analysis, S.B., A.G., Ö.E., H.Y. and S.K.; investigation, S.B., A.G., Ö.E., H.Y. and S.K.; resources, F.M.Y., S.B., A.G. and Ö.E.; data curation, F.M.Y., S.B., A.G. and Ö.E.; writing—original draft preparation, F.M.Y., S.B., A.G. and Ö.E.; writing—review and editing, F.M.Y., S.B., A.G. and Ö.E.; supervision, F.M.Y.; project administration, F.M.Y., S.B., A.G. and Ö.E.; funding acquisition, H.Y. All authors have read and agreed to the published version of the manuscript.

Funding: This study was supported within the scope of TÜBİTAK-2209-B Industry Undergraduate Research Projects Support Program.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Available upon a reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

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