Turn Waste into Good Taste

S. Zlatanović[1], D. Micić[1], F., Pastor[2], S. Ostojić[1], S. Gorjanović[1]
[1] Institute of General and Physical Chemistry, Studentski trg 12/V, 11158 Belgrade, Serbia
[2] University of Belgrade, Faculty of Chemistry, Studentski trg 12-16, 11158 Belgrade, Serbia;
sgorjanovic@yahoo.co.uk

The food processing industry generates large quantities of by-products, especially in fruit and vegetable processing for juice production, creating environmental and economic challenges. Pomace, obtained as a residual material after juice extraction from fruits and vegetables is often underutilized despite being a rich source of dietary fiber, phenolic compounds, and other bioactive molecules. The valorization of such waste streams into functional food ingredients represents a key strategy within sustainable and circular food systems. The results presented here are part of the *WasteBridge* project No 7439, funded by the Science Fund of the Republic of Serbia, which focuses on transforming agro-industrial waste into value-added food products. Research conducted within the *WasteBridge* project, supported by previously published studies, demonstrates that pomace flours possess significant functional and nutritional potential. Apple pomace flour obtained by industrial dehydration shows high antioxidant activity, as well as antidiabetic and anti-obesity potential, mainly due to its rich polyphenolic profile and dietary fiber content (Gorjanović et al., 2020). Additionally, thermal analysis confirmed that apple pomace flour exhibits satisfactory stability during food processing conditions (Zlatanović et al., 2019a).

The incorporation of pomace flours into food products has yielded promising results. High substitution levels (up to 75%) of wheat flour with apple pomace flour in cookies were achieved without compromising technological performance, while significantly improving nutritional quality (Zlatanović et al., 2019b). Furthermore, the addition of apple and beetroot pomace flour to jelly candies enhanced their fiber content, antioxidant capacity, and functional properties, while maintaining acceptable sensory characteristics (Gorjanović et al., 2024).

Overall, pomace flours demonstrated a strong potential to improve the nutritional profile of food products, particularly by increasing dietary fiber content to levels that enable “high fiber” claims and contribute to a more favorable carbohydrate-to-fiber ratio, which is associated with recognized health benefits. The findings from the *WasteBridge* project confirm that agro-industrial waste, particularly apple and beetroot pomace, can be successfully transformed into high-value functional ingredients. The integration of pomace flours into food products enhances their nutritional and functional properties while contributing to waste reduction and sustainability goals. This approach supports the development of circular economy models in the food industry. Future work should focus on broader industrial applications and long-term health impact assessments.

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, 7439 GRANT No, FromWaste to Food and Soil Enrichment—minimizing waste by applying circular economy in fruits/vegetables processing industry—WasteBridge and by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, grant numbers: 451-03-33/2026-03/200051 and 451-03-33/2026-03/200168.

References

Gorjanović, S., Micić, D., Pastor, F., Tosti, T., Kalušević, A., Ristić, S., & Zlatanović, S. (2020). Evaluation of apple pomace flour obtained industrially by dehydration as a source of biomolecules with antioxidant, antidiabetic and antiobesity effects. Antioxidants, 9(5), 413.

Gorjanović, S., Zlatanović, S., Laličić-Petronijević, J., Dodevska, M., Micić, D., Stevanović, M., & Pastor, F. (2024). Enhancing composition and functionality of jelly candies through apple and beetroot pomace flour addition. npj Science of Food, 8, 85.

Zlatanović, S., Ostojić, S., Micić, D., Rankov, S., Dodevska, M., Vukosavljević, P., & Gorjanović, S. (2019a). Thermal behaviour and degradation kinetics of apple pomace flours. Thermochimica Acta, 673, 17–25.

Zlatanović, S., Kalušević, A., Micić, D., Laličić-Petronijević, J., Tomić, N., Ostojić, S., & Gorjanović, S. (2019b). Functionality and storability of cookies fortified at the industrial scale with up to 75% of apple pomace flour produced by dehydration. Foods, 8(11), 561.

Snežana Zlatanović - 0000-0002-8450-602X, Darko Micić - 0000-0001-6905-8954, Ferenc Pastor - 0000-0003-0813-9085, Sanja Ostojić - 0000-0002-9853-1189, Stanislava Gorjanovic - 0000-0003-3676-5892