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NEWS

FOOD SAFETY AND HEALTH

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Olive mill wastewater as booster to produce a blood orange juice with high healthy value

Recently, a large demand from food industry for new plant ingredients with a distinct technological and healthy functionality has been registered to meet new market demands. In this context, the agro-food industry byproducts can be a useful income recovery as well as a significant resource for developing novel additives and natural food ingredients. Therefore, in a circular economy perspective, the implementation of innovative and green technologies based on the valorization and reuse of by-products represents a virtuous model for obtaining high value-added substances that can be used as antioxidants, preservatives, and antimicrobials. The use of these natural matrices rich in bioactive compounds will not only have a positive effect on the food shelf life, but will bring a qualitative improvement in the nutritional, health, and safety profile of the final product.

The olive mill wastewater (OMW) is obtained by the olive oil extraction system, and it not only represents a significant management problem but also a high added value resource rich in bioactive molecules. In detail, during the olive oil extraction process, only a minor content of antioxidant compounds is present into olive oil, as most of them is in the by-products. Indeed, only 2% of the phenolic compounds deriving from olives is found in virgin olive oil after olive processing, while the most fraction is detected in olive oil by-products: about 53% in OMW and 45% in olive pomace. Olive phenols have been recognized as safe by the European Food Safety Authority (EFSA), with a health claim regarding a daily dose of 5 mg of hydroxytyrosol or its derivatives (EFSA Journal 2011; 9(4):2033). Recently, an Italian team studied the different concentrates obtained from OMW through tangential membrane filtration techniques at the industrial level, such as ultrafiltration and reverse osmosis, in order to select nutraceutical molecules for food industry.

In particular, blood orange juice, characterized by a full red coloring, high levels of bioactive compounds, and high acidity, can act as a suitable carrier of nutraceutical molecules. The team recovered phenols from OMW by reverse osmosis and the obtained phenol concentrate was used as antioxidant booster in blood orange juice. The addition of the concentrate provided a significant increase in phenols but did not affect the sensory traits of blood orange juice up to 2:250 v/v ratio. Furthermore, under refrigeration, the fortified juice maintained its phenolic content stability for the full 60 days of its maximum shelf life. The fortified juice exhibited a hydroxytyrosol content that met the EFSA health claim's recommended daily intake.

In conclusion, the proposed by-product management can effectively represent an income-generating solution by creating a bridge between olive oil industry and food and beverage companies for the formulation of new products with enhanced nutraceutical value. The study confirmed that the tangential membrane filtration on an industrial scale is a suitable strategy to enhance the value of OMW. The user companies of such an easy-to-implement green technique can create a strong collaboration with food industry for the formulation of new clean-label nutraceutical products.

For more information, see the paper 'Phenols recovered from olive mill wastewater as natural booster to fortify blood orange juice', Foti et al., Food Chemistry 393, 133428 (2022), https://doi.org/10.1016/j.foodchem.2022.133428.

AUTHOR CONTRIBUTIONS

Paola Foti: Conceptualization; formal analysis; methodology; writing – original draft. **Flora V. Romeo**: Conceptualization; methodology; resources; writing – review & editing. **Cinzia Caggia**: Conceptualization; resources; supervision; writing – review & editing.

CONFLICT OF INTEREST STATEMENT

In accordance with the Ethical Standards of the Journal, the authors declare no competing financial interest.

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