ETH zürich

Food Day @ETH 2022

PHENOLIVA: Treatment and valorisation of olive mill wastes

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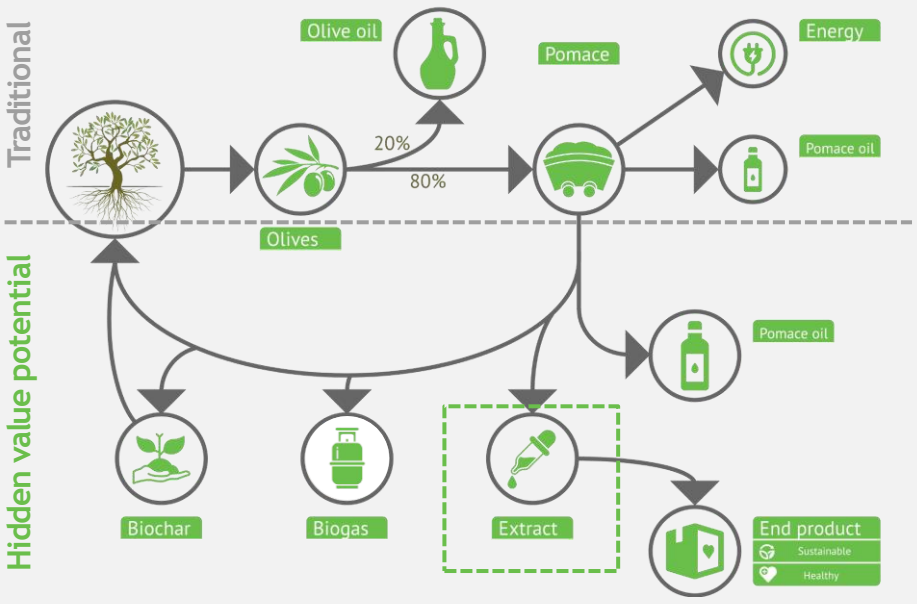
1 Motivation

- In olive oil production, 20% of olives ends up as oil and the remaining 80% makes up olive pomace, a by-product
- Olive pomace contains ~98% of olive antioxidants
- In Spain alone, 4-6 million tons of pomace are produced each year

Integrated waste management for olives



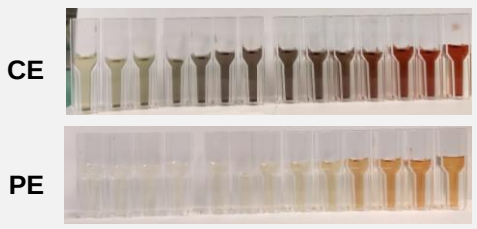
- Main product: natural olive pomace extract with hydroxytyrosol (HT) as the main antioxidant
- Challenges include undesired effects on colour when applied to food products

Aim

Characterisation of colour components in the olive pomace antioxidant extract

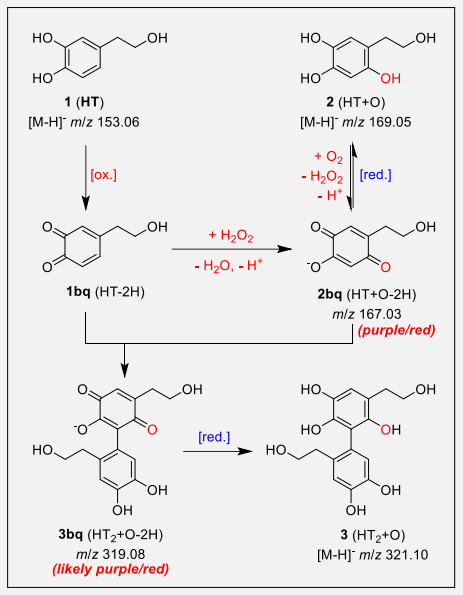
2 Method & Results

- Study of the colour behaviour of the extract and of HT across food matrix parameters using UV/Vis spectroscopy, CIELab measurements and UPLC-MS/MS



Colour behaviour of the antioxidant extract in Milli-Q water (top: crude extract; bottom: purified extract) across a pH range of 1 – 14

- HT in tap water conditions at pH 7.5 degraded within days and developed a red colour (λ_{max} = 490 nm)
- Products of HT oxidation were identified via UPLC-MS/MS, including a known red chromophore



Suggested structures of the main oxidation products of HT degradation under tap water conditions, based on UPLC-MS/MS analysis and literature precedence

3 Conclusion

The results have implications for the use of the olive pomace extract as a functional food ingredient. To avoid a decrease in stability or the degradation of antioxidants like HT, as well as unwanted colour changes which may affect the visual properties of the final product, important factors such as pH and the presence of metal cations and anions such as bicarbonate must be controlled.

4 Contribution to Sustainable Food Systems

The PHENOLIVA project promotes circularity in the olive oil industry by converting food by-products into valuable resources, at the same time increasing profitability for different stakeholders along the olive value chain.

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Funded by the European Union

World Food System Center