

ImPrOVE

Innovative (pre)POmace Valorization procEss



Summary

- ImPrOVE addresses a wide agro-related problem: pomace resulting from the fruit processing.
- aims to fully valorize pomace by using a combination of existing and innovative processes.
- total valorization is achieved in 3 clusters: (1) pretreatment giving raise to aromas and oil from separated seeds; (2) extraction of high value materials from the pretreated pomace and (3) valorization of the resulting fibers, either directly (functionally designed fibers) or by splitting cellulose-lignin and valorizing both materials physically, enzymatically and/or chemically.
- use alternative solvents like bio-based Ionic Liquids (BIOILs) and natural deep eutectic solvents (NADESs) for the extraction of HPV and fibers like cellulose and lignin.

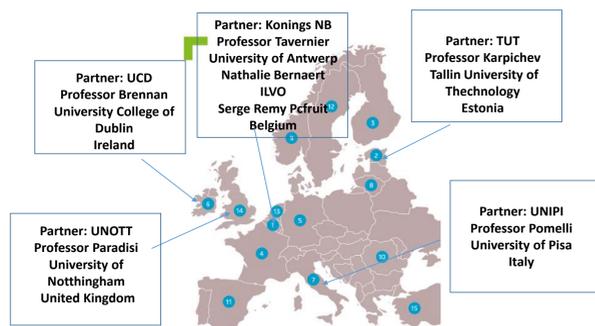


FIG. 1 Partners involved in the ImPrOVE project.

Main objective

- to develop and validate a safe and robust multi-stage strategy to fully valorize fruit pomaces, focusing principally on aroma capture (WP2), oil and high-added value products (HVP) extraction (WP3 and WP4) and fibrous fraction recovery and transformation (WP6 and WP7).
- sustainability aspects: use of BIOILs and NADESs for the extraction of oil, HV compounds, and lignin and cellulose from the pomaces.
- assessment of the potential uses of the obtained products and materials (WP5), evaluating their applicability in food and/or in cosmetic industry.

Preliminary Results

- DESs and ILs were synthesized in UNIPI and biodegradability tests were performed in TUT.
- The synthesized DESs and ILs were screened in the extraction of polyphenols from 2 types of apple pomaces and 2 types of olives pomaces. Pcfruit had selected the more promising apple types.
- Extracts obtained by classical extraction methods and with DES/ILs from two types of apple pomaces (Jonagold and Bitter sweet mix) and 2 types of olive pomaces were characterized by HPLC.
- The extracts were send to UCD for further analysis.
- The solid residue were send to UNOTT for further analysis.

Preliminary Conclusions

- Both NADESs and BIOILs were tested from the biodegradable point of view by TUT and all passed the test of biodegradability (the most promising DESs are those based on ChCl and levulinic acid or ethylene glycol) and inherently biodegradable Cholinium Oxalate (53 %).
- Apple pomaces were obtained from ILVO and Konings.
- The NADES based on cholinium chloride and polyols and organic acids were used in the extraction of polyphenols from apple pomaces (Bitter Sweet Mix and Jonagold) and two types of olives. Some of the common polyphenols were identified: procyanidin B2, chlorogenic acid, phlorizin (apples pomaces) and tyrosol, hydroxy tyrosol, oleuropein and luteolin (olives pomace). Even though, 30 polyphenols standards were employed in the identification of the polyphenols present in the extracts, full identification is still ongoing.
- The extracts obtained by classical methods and with NADES were sent to UCD and, for some extracts, the antioxidant capacity was revealed.

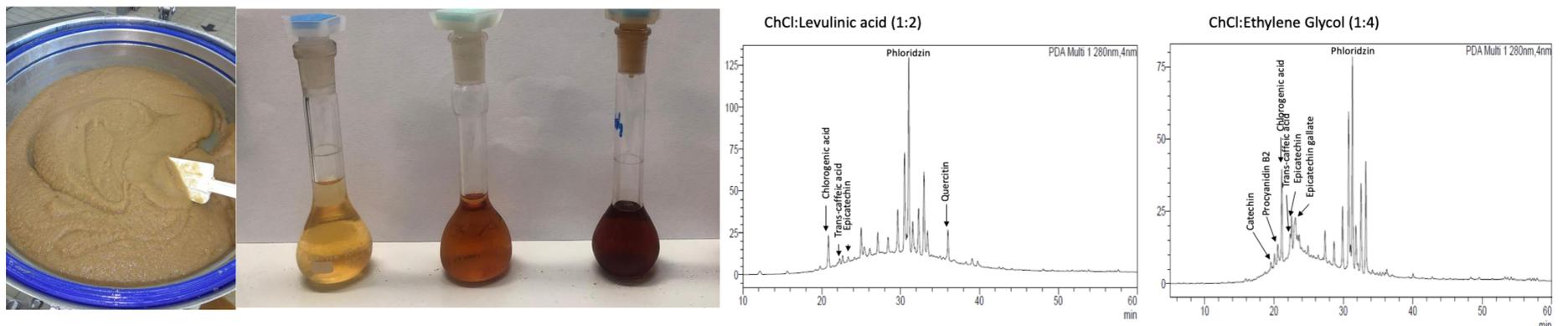


FIG. 2 From left to right: fruit pomace, pomace extracts, HPLC of two samples extracted with different DESs.

Topic 1: Innovation in food processing technologies and products.

Topic 2: Providing added value, increased resource efficiency and reduction of waste in sustainable food systems.

Topic 3: Understanding consumer behavior and food choice.

