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Chemical valorization of viticultural waste in Savoie Mont Blanc (France): high-value compounds extraction as an alternative to open-air burning practice

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PURPOSE OF THE ABSTRACT

In 2017, France was the first exporter and the second largest producer of wine worldwide with a production of 36.7 million hectoliters and a vineyard surface of 787,000 hectares [1]. During the winter period, these viticultural surfaces produce high amounts of waste, most of it resulting from the vineyards pruning. On Savoie Mont Blanc (SMB) territory (France) for example, a survey of local viticultural professionals showed that the Savoyard wine sector generates 28,000 m3 of woody residue annually including vine-shoots, grapevine stocks and vine nurseries waste. Theses residues remain unvalued, traditionally burned or let on the field. But since December 2017, a prefectoral decree prohibits the open-air burning of agricultural waste (including viticultural waste) on the territory. In this context, the VITIVALO project emerged in 2017 with the main purpose of valorizing viticultural waste on the SMB territory. It envisions chemicals recovery as the first step of a valorization cascade that would reuse the woody residue after extraction process as material or compost in collaboration with all the actors of the VITIVALO project and in a prospect of circular economy on the territory.

Indeed, it has been demonstrated that vine by-products, including vine-shoots and grapevine stocks, contain high-value compounds, such as stilbenes. Among others, trans-resveratrol (Rsv) and trans-epsilon-viniferin (Vf) are valuable for a wide range of applications, particularly in the nutraceutical and cosmetic fields [2-4].

This work aims to evaluate the chemical potential (i.e Rsv and Vf contents) of local viticultural waste by using a classical extraction technique [5]. It reveals that two vine-shoots and grapevine stocks varieties, Jacquère and Mondeuse (the most abundant grapevine varieties in Savoie), contain high amounts of both compounds (up to 6100 mg(Rsv)/kg and 6600 mg(Vf)/kg for Jacquère and up to 4600 mg(Rsv)/kg and 5300 mg(Vf)/kg for Mondeuse) in comparison with Pinot Noir or Gewurztraminer vine-shoots known to be rich in stilbenes [6,7]. In addition, several parameters upstream the extraction process have been investigated for the first time for these varieties to enhance extraction efficiency of Rsv and Vf. Therefore, grapevine variety, age of vines, wine farm of origin, time of material storage and granulometry of the woody material, have been considered for chemical extraction optimization.

FIGURES

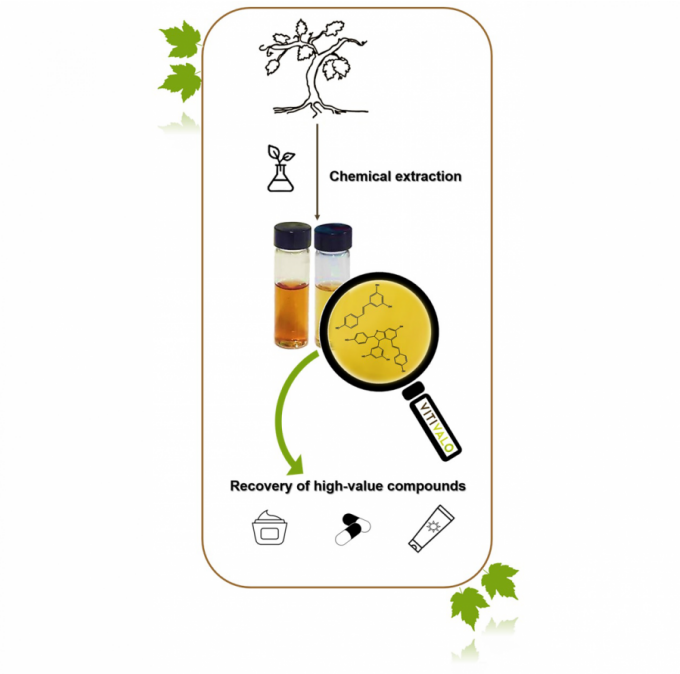

FIGURE 1

Figure

High-value compounds recovery as the first step of a valorization cascade of viticultural waste in the VITIVALO project context.

FIGURE 2

KEYWORDS

Viticultural waste | Chemical valorization | Stilbenes

BIBLIOGRAPHY

[1] International Organisation of Vine and Wine, http://www.oiv.int/en/, (accessed October 23, 2018).
[2] C. Billard et al., Leuk. Lymphoma, 2002, 43, 1991–2002.
[3] J. A. Baur et al., Nature, 2006, 444, 337–342.
[4] C. Romain et al, J. Agric. Food Chem., 2012, 60, 11029–11036.
[5] M. Zwingelstein et al., ACS Sustain. Chem. Eng., 2018, submitted.
[6] V. Sáez et al., J. Chromatogr. B, 2018, 1074–1075, 70–78.
[7] Z. Piñeiro et al., Food Bioprod. Process., 2017, 103, 18–26.