**Wine by-products valorisation by green chemistry methods: Impact of the extraction process on the structure, functionalities and activity of the extracted molecules**

Gayane Hayrapetyan(1,2), Karen Trchounian(2), Laurine BUON(3), Laurence Noret (1), Maria Nikolantonaki (1) , Ali Assifaoui (1)

(1) UMR PAM, Equipe PCAV, Université de Bourgogne/Institut, 1 Esp. Erasme, Agrosup, 21000 Dijon, France

(2) Department of Biochemistry, Microbiology, Biophysics and Biotechnology, Yerevan State University, 1 Alek Manukyan St, Yerevan 0025, Armenia

(3) CERMAV (Centre de Recherches sur les Macromolécules Végétales), 38041 Grenoble, France

**Keywords:** SC-CO2 extraction, grape pomace, green chemistry extraction, pectin, phenolic compounds

Viniculture is a huge socio-economic activity throughout the world, with an estimation, around 57% of worldwide grape production is for winemaking industry. Winemaking generates huge amounts of by-products such as grape pomace (contains skins, pulp, seeds and stalks), which is around 20 % of total wine production [1]. Wine by-products are promising sources of valuable high-added components, however they are directly sent to distilleries for alcohol, spirits and piquette production. The treatment of biomass is often challenging due to its complex nature and composition. Heavy industrialization and associated huge environmental impacts push scientists to reconsider traditional chemistry methods.

The aim of our work is to valorise a valuable winery by-product (grape pomace) by the implementation of Supercritical fluid extraction (SC-CO2) method. In this study water as co-solvent was applied targeting mainly phenolic and pectic substances. The experimental design followed sequential extraction technique and included three different temperature conditions (40, 60 and 80 °C) under constant 400 bar pressure. Phenolic and pectic substances were detected in SC-CO2 and water as co-solvent extracts. The following phenolic compounds were quantified by UHPLC; Gallic (GA), Protocatechuic (PCA), Coumaric (CouA), Caftaric (CTA) acids and Procyanidin B1 (PRC B1), Procyanidin B2 (+) (PRC B2), Catechin (CT) and (-) Epicatechin (ECT). The optimal conditions for the wine related phenolics were found to be 60 °C, 400 bar. Low methoxyl %DE = 23 pectic substances were also appeared in extracts starting from 60 and 80 °C, 400 bar with the Mw ranging from 399 to 441 kDa accordingly.

[1] Arvanitoyannis I. S., Ladas D., Mavromatis A., « Wine waste treatment methodology », *Int J Food Sci Tech*, vol. 41, no 10, p. 1117‑1151, 2006