

## PERSPECTIVE DIRECTIONS FOR THE RECOVERY OF WINE WASTE IN THE REPUBLIC OF MOLDOVA

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The global production of grapes exceeds 79 million tons in 2018, of which 75% is intended for wine production, which generates approx. 20–30% of the residual products (FAO-United Nations). These by-products are used to produce wine alcohol, serve as fertilizer or as animal feed, but most often remain unused. The disposal of these wastes creates environmental problems such as ground and surface water pollution, attraction of disease vectors and excessive oxygen consumption in soil and groundwater. The biodegradation of these wastes is slow, due to the low pH and the presence of compounds with antibacterial properties, such as polyphenols. At the same time, grape pomace contains significant amounts of substances that can be considered beneficial for health. Grape seeds are composed of 40% fiber, 10–20% lipids, 10% protein, and the rest are sugars, polyphenolic compounds, and minerals. The most important component of grape seeds is oil, rich in unsaturated fatty acids, especially linoleic and oleic acid. In addition, there is a significant amount of vitamin E, sterols and other bioactive compounds that possess antioxidant and anticancer activity. The utilization of grape pomace seeds for oil extraction presents an opportunity that brings important added value to primary processing enterprises of grapes. But to carry out this process, it is necessary to have equipment for drying and separating the seeds, given the perishability of the pomace, which must be processed immediately after the vinification process.

Dietary fibers and polyphenolic compounds remain in the pomace after the winemaking process in significant quantities (approximately 70%). The main part of dietary fiber consists of insoluble fibers such as cellulose and hemicelluloses. Insoluble fibers are characterized by high porosity and low density, improving the efficiency of the digestive tract [4]. Some fibers in grape pomace form chemical bonds with phenolic substances and thus create antioxidant dietary fiber, giving pomace radical scavenging potential. This gives them a higher nutritional value compared to the dietary fiber present in grains.

Together with dietary fiber, polyphenols are the most valuable compounds in grape pomace with beneficial health properties, such as maintaining intestinal health, preventing chronic diseases, cancer, etc. The antioxidant potential of polyphenols allows their use in food preservation due to the inhibition of lipid oxidation and the marked antibacterial effect. The mechanisms of antioxidant activity are based on their structure and include the ability to capture radicals, electron donation or metal ion chelation. Anthocyanins have a food coloring potential, but being susceptible to changes due to light, temperature, pH or other external factors, it is necessary to stabilize these pigments.

But in addition to compounds beneficial to health, grape pomace may also contain compounds dangerous to health - mycotoxins, including ochratoxin A, which is classified as carcinogenic. Over 90% of ochratoxin A (OTA) from grape processing is retained in the pomace. This imposes the need to verify the presence of the DNA of toxic species and, depending on their absence/presence, the subsequent distribution of the pomace for processing. The thermal stability of OTA at temperatures up to 250 °C makes contaminated pomace unavailable even for the production of sorbents.

Thus, the management of grape pomace waste represents an important environmental issue. On the other hand, grape pomace as a by-product of wine production represents a valuable source of important nutrients. But for the valorisation of this product, a rigorous microbiological control is necessary, after which the uncontaminated pomace will be directed for the extraction of biologically active compounds (polyphenols, anthocyanins, fibers) with the subsequent processing of the spent pomace to obtain sorbents intended for water purification <https://intelwastes.utm.md/wp-content/uploads/2022/02/Ghid-de-bune-practici-Intelwastes.pdf>. Otherwise, the pomace will be directed to obtain composts or for methanization.

**Keywords:** grape pomace, dietary fibers, polyphenols, grape oil, anthocyanins.

**Acknowledgments:** The authors would like to thank the Project 2SOFT/1.2/83 *Intelligent valorisation of agro-food industrial wastes*, funded by the European Union, within the program Cross border cooperation Romania - Republic of Moldova 2014-2020.