

03GRAPE2.0

Project title: Use of innovative green technologies for the preservation of winegrape quality during the ripening process

Acronym: 03GRAPE2.0

Project duration: 19 months – Start date: 01/09/2017 End date: 31/03/2019. That project needs to start in September in order to get fresh grapes.

Key-words: Ozone, electrolyzed water, ripening, grape quality, phenolic compounds, VOCs, innovative analytical techniques

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Summary:

In France and Italy, viticulture is a leading sector for the economy. Nevertheless, several pathogens affect grapevine leading to production losses if they are not effectively treated. The disease management in the vineyard with fungicide and antimicrobial treatments is often expensive from the economic and environmental point of view. In this context, and taking into account the actual objectives of the European Commission to reduce the use of all types of fungicides for plant protection, new sanitizing strategies have to be developed on the basis of emerging green technologies. The vine treatments with ozonated or electrolyzed water could represent environmentally-friendly alternatives to fungicide and antimicrobial treatments without affecting negatively the grape quality during ripening. In postharvest technology, grape withering under ozone-enriched atmosphere could be also used as a control strategy against *Botrytis cinerea* (grey rot).

The fast detection of possible losses of grape quality is being increasingly demanded in the viticulture and oenological sector due to the high economic costs involved. Analytically, sample preparation, including the extraction of secondary metabolites, is usually the most critical and time-consuming step of the analysis and often involves analyte losses, sample contamination and large amounts of reagents. Therefore, the development of inexpensive, fast, simple, reliable and low reagent consumption methodologies, particularly based on non-destructive analytical techniques, will be particularly useful for routine monitoring of the compositional and physical changes occurring during grape ripening and withering process (on- and off-vine).

The main aim of this project is to evaluate the effectiveness of using ozonated and electrolyzed water as sanitizing agents in the plant to improve the environmental sustainability of vineyard management, as well as of the application of gaseous ozone during grape withering to control grey rot. Therefore, the influence of these treatments will be investigated at the level of the plant diseases control and microbiota present on the grape cluster surface. Furthermore, the elicitor effect for secondary metabolites and the impact on the grape quality will be assessed by means of the chemical composition and physical properties of grapes. In this sense, also innovative non-destructive analytical techniques (NIR and Raman spectroscopy particularly) will be applied to the grape analysis and compared with conventional techniques (HPLC and GC) in terms of simplicity, speed and accuracy.

This project will contribute to the development of effective and innovative solutions for a more sustainable management of the grapevine. The application of ozonated or electrolyzed water in the vineyard, as well as of gaseous ozone during postharvest grape withering, could select microorganisms present on the grape surface and provide positive effects on the grape quality from sanitary, physical and chemical point of view. The use of non-destructive, fast and environmentally-friendly analytical approaches will facilitate the quality control of the grapes.