

Portable biosensor-based device for mapping the risk of grape infection by Botrytis cinerea in the vineyard (WINBIOTOOL)

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The project WINBIOTOOL is coordinated by ENKOA (Basque Country, Spain), the activities being carried out by a well-balanced consortium that includes 3 SMEs, a large enterprise and 2 public research institutions from Romania and Spain.

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ABSTRACT

WINBIOTOOL project aims to provide a tool for wine producers in the form of an integrated detection platform, combined with mapping and decision software. This tool allows the in-field, early detection of fungal attack by *Botrytis cinerea* and screening laccase activity in grapes and throughout wine production, recommending the best decision for minimizing the impact of the fungal attack. The instrument includes electrochemical biosensors, GPS sensors and web application and combines KETs (Key Emerging Technologies) and ICT (Information and Communication Technologies) to map the fungus spread in the vineyard. Starting at TRL2, the project will advance to TRL4, delivering an instrument tested at winery level as main outcome of high added value. Carried out by 4 SMEs/Industrial partners and 2 Public Research Centers, WINBIOTOOL will provide a product that will facilitate obtaining high quality/yields of wine production and will contribute to the European companies' competitiveness in the global wine industry.

The main goal of the project is to provide the wine producers with an innovative and integrated solution capable of in-field, easy, early detection and decision support regarding the fungal attack by *Botrytis cinerea* in vineyard as well as for the laccase activity in grapes and throughout wine production. The results are stored in the cloud, allowing, via web application (1) the easy mapping of the fungus infected areas in the vineyard and screening laccase activity in grapes and during winemaking as well as (2) timely making the best decisions (e.g. harvest time, apply fungicides, grape classification, apply wine treatments) for highest quality and yield of wine production.

The specific objectives of the project are:

(O1) To develop electrochemical biosensors for the detection of *Botrytis cinerea* and laccase activity in grapes and wines, able to perform in field conditions as well as in laboratory environment.

(O2): To integrate the biosensors in a portable detection device, together with GPS sensors and more classic temperature/humidity sensors. The portable device will enable in-field measurements for mapping the vineyard for the zones at risk of fungal attack and measurements in the winery throughout wine production.

(O3): To prove the functionality of the biosensors and the detection device by validation in comparison with standard tests currently performed in the wine industry.

(O4): To develop a mapping and decision tool including a web application tool that integrates the information derived from the portable integrated detection device and based on pre-established parameters alerts the user and provides recommendation of the most appropriate decision with regards to grape/wine production.

Phase 1/2020

The main objective pursued in this stage was the validation at the laboratory level of the biosensor for *Botrytis cinerea* and the preliminary development of: (1) the sensor for laccase, (2) the portable detection device and (3) the specifications for application support for the management of the risk of fungal infection in the vineyard.