

## Portable biosensor based device for mapping the risk of grape infection by *Botrytis cinerea* in the vineyard – **WINBIOTOOL** prototype



### General specifications of the portable device:

- Sensor type – gold screen printed electrode
- Sample volume – 100 $\mu$ l ( on the electrode surface )
- Sample inject – manual , using pipette
- Physical sensors – temperature and humidity
- Amperometric detection – laccase activity – 5 minutes
- Amperometric detection – botrytis cinerea – in validation
- Cyclic voltammetry – laccase activity – 3 minutes
- Electrode Washing – manual
- Dimensions – 30mm x 18mm x 3mm
- Weight – 550grams

Portable device can be parametrized at requested user specifications. There is a certain degree of flexibility for applicative software.

Prototype includes the following modules :

- Amperometric Measurement – 1 channel
- Voltametric Measurement – 1 channel
- Analogic measurement – temperature, humidity and battery
- Localization – GPS Module
- Power – low voltage ( 3.7V , LiPo battery )

These modules are integrated in a portable device capable to measure in vineyard, establish the GPS position and offer the electrochemical response of the biosensor.



Main functionalities of the embedded software are :

- Graphic user interface – structured on applicative menus - options available
- Measuring with physical sensors – customization available, analog & digital
- Amperometric detection – customization available
- Voltametric detection – customization available
- Communication capabilities – several directives available

Embedded software developed in C language, performing GUI for user friendly experience.

Device integrates ARM CORTEX-M3 microcontrollers (Cypress-PSOC 5, ADuCM355-PICO, STM32F103) using customized firmware and embedded platforms that allows electrochemical measurements at low cost.

**Other tools :**

- Calibration – for amperometric detection
- Temperature and humidity compensation
- Electrochemical detection – potentiostatic methods
- Communication facilities – several integrated directives
- Graphic control & GUI – touch screen and graphical buttons

**Patent pending in Romania no. A/ 00078 / 16.02.2022** at [www.osim.ro](http://www.osim.ro) with the title “*Dispozitiv de măsura portabil*” describing the internal modules and functionalities for the portable measuring device.

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Contact: **Petru Epure , 0748-198987**    **EPI-SISTEM SRL Sacele – BRASOV - ROMANIA**