

Portable air analysis device for on-site pest detection during plants import controls

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Introduction

Context

Currently, **plant material** imported into the European Union (EU) must be inspected before entry. However, the **inspection process** is labour-intensive due to:

- **Visual** assessment;
- **Low detection** throughput;
- **Physical sampling**.

It results in only a **small** proportion of plant material being inspected. Consequently, **pest-infested plants** are imported into the EU, contributing to the **spread of invasive species** and posing a **threat** to the EU.

Objective

senseApest project aims to address these challenges using **Volatile Organic Compounds (VOC)** released by the plant in response to **pest attacks**. These biomarkers will be exploited to develop a **Portable Detection Unit (PDU)** equipped with:

- **VOC sensors**;
- An **algorithm** and a **database**;

The presence of pests will be determined **quickly** and **non-invasively**.

About the project: Work Packages

- WP1 **Coordination** and **management**
- WP2 **Specification** of **VOC profiles**
- WP3 **Industrial, laboratory calibration methods**
- WP4 **Sensor** development for specific pests
- WP5 **Laboratory** studies, validation of tools
- WP6 **Integration** of sensors components **into PDU**
- WP7 **Field** studies, validation of tools
- WP8 **Enhanced automatic data treatment**
- WP9 **Dissemination, exploitation, impact**

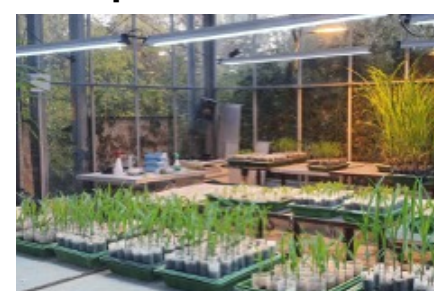
Perspectives

Used at **EU borders** for **plant import control**, this tool will efficiently inspect plants, allowing for:

- Inspect **90%** of imported **plants**;
- **Prevent the importation** and **limit the spread** of pests;
- **Reduce pesticide** use;
- **Protect European agriculture** and **plant material**;
- **Time and cost-efficiency**;
- **Adaptable**;
- **User friendly**;
- **Non invasive, non destructive**;
- **Identifies pests biomarkers**.

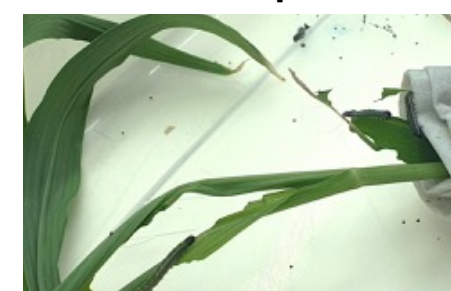
Material and methods

Maize plant culture



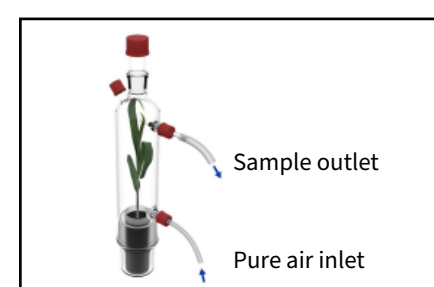
Realized by UNINE

Infestation with pests



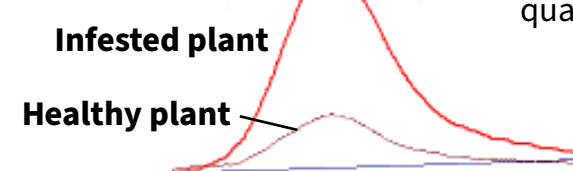
Continuous VOCs measurement with online analyser

Collection of VOCs



AirToxic analyser developed by Airmotec transportable TD-GC-PID
TD-GC-PID: Thermal Desorption – Gas Chromatography – Photo Ionisation Detector

Results



Biomarker identification: compounds emitted in higher quantities when **plant is infested**

Chromatographic peak obtained with **AirToxic analyser** for healthy and infested plant analysis

Tool to be developed: PDU

- **Online** and **portable**
- **Miniaturised:** < 10 kg
- **2 analytical modules**
- **High accuracy**
- **Sensitive:** 10 ppt – 100 ppt

SenseApest: Dissemination, exploitation & impact

Objective

- Develop and implement the Dissemination, Exploitation and Communication Plan (PDEC).
- Implement a **multi-actor approach** to maximize stakeholder engagement.
- Assess **economic impacts** of reduced PDU device.

Methods

- Multi-actor approach: Forming **Stakeholder committee** and organizing two workshops in the Year 2 and Year 3.
- **Feedback** collection - Through surveys and workshops from stakeholders.
- **Impact Assessment**-Real options and cost benefit analysis.

Expected Results

- Integrating stakeholder feedback into project outcomes.
- Development of baseline (“no control”) and 50% invasion reduction **scenarios** under alternative control policies.
- **Economic impact assessment** of control possibilities.
- EU implementation roadmap.