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

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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.

Introduction

senseApest** project **concept:** analysis of **VOC signatures

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**;

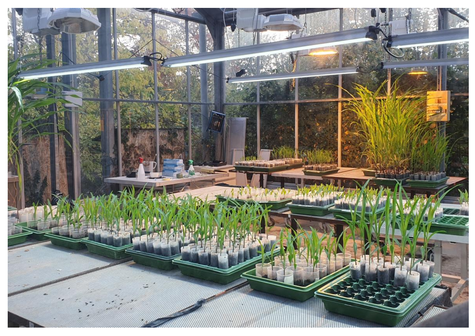
The presence of pests will be determined **quickly** and **non-invasively**.

About the project: Work Packages (WP)

- **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**

Material and methods

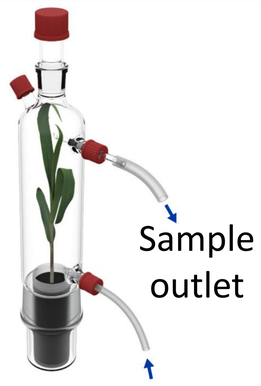
Maize plant culture



Realized by **UNINE**

Infestation with pests

Collection of VOCs

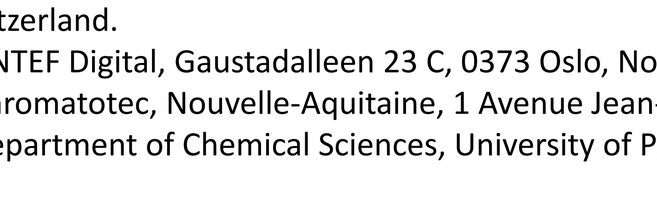


Continuous VOCs measurement with online analyser

AirToxic analyser developed by **Airmotec transportable TD-GC-PID**

TD-GC-PID: Thermal Desorption – Gas Chromatography – Photo Ionisation Detector

Results



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

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

Tool to be developed: PDU

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

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;**

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SenseApest: Dissemination, Exploitation & Impact

Led by Wageningen University

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.

Stakeholder Committee (SCO)

• ***What is it?***

Multi-actor advisory body that ensures stakeholder input guides project development, validation, and implementation.

• ***Who can participate?***

Representatives from border control, plant protection authorities, industry, SMEs, academia, farming and other relevant organizations.

Stakeholder Engagement Process

Stakeholder Mapping & Invitations → **SCO Establishment** → **Information sharing & Discussions** → **Two workshops in year 2 & 3 for Feedback Collection & Analysis** → **Integration into WPs**

Meet the senseApest partners

Join Our Stakeholders Committee (SCO)

We welcome interested stakeholders to join our Stakeholders Committee (SCO) and contribute to the project.

Contact us to become a SCO member

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Discover more at

https://senseapest.unistra.fr

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