**Detect Plant Diseases In 4 Steps**

**Background**

ViTEST is a rapid, field-based diagnostic tool to detect infectious grapevine diseases within 3 hours. It requires no lab equipment or special training, and saves on crop loss and pesticide use.

**Hardware**

1. **Microneedle Extraction**
   - **DNA Extraction**
   - **DNA Assembly**
   - **DNA Amplification**
   - **DNA Incubation**
   - **DNA Transfection**

2. **Isothermal Amplification**

3. **Toehold Regulation**

4. **Signal Generation**

**Conclusion**

Our novel plant diagnostic system is a proof-of-concept to detect phytoplasma plant diseases in 4 steps including microneedle extraction, isothermal amplification (IPA), toehold regulation, signal generation by using our in-house Output PCR system. We also developed an easy-to-use, field-based diagnostic hardware that allows us to detect infectious grapevine diseases within 3 hours.

**OnePot PURE System**

A main part of our project is the expression of protein that will produce an observable signal. In order to have a complete field-based diagnostic test, we opted to design a field-based diagnostic system. The system includes a PCR hybridization region to detect and quantify the presence of the specific target sequence. To prove this system, we have decided to produce our own FID system based on our isolation that was developed in 2019, in cooperation with Dr. L. M. Zhang, Chairman of the Department of Plant Pathology and Crop Sciences at Ohio State University. The system is capable of detecting a 1.4-fold decrease in water content and we are able to produce the desired protein.

**More details**

**References**

- BioNTech
- DNA Sequencing
- PCR
- ELISA
- Bioinformatics
- Microscopy
- Imaging
- Internal Control
- RNA
- DNA
- Protein
- Antibodies
- Microarray
- Mass Spectrometry
- Flow Cytometry
- Western Blot

**Supporting Software**

- IDT
- Microsynth
- BioLabs
- Nikon
- Promega
- Roche
- TWIST

**EPFL iGEM**

EPFL iGEM is an iGEM team from the Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland, which competes in the International Genetically Engineered Machine (iGEM) competition. The team is composed of students from EPFL and ETH Zurich, and aims to design, build, and present a genetically engineered organism that solves a real-world problem.