



Smartphone-Based Fluorescent Array Sensor for a Rapid Detection of Plant Pathogenic Fungi

Giuseppe Trusso

Precision Agriculture – Spoke 1/WP 5, Task 3

**SAMOTHRACE 2nd Year:
Experimental Prototypes Demo Showcase**

SAMOTHRACE PROJECT ECS00000022

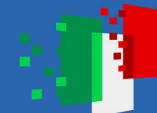
March 10th 2025



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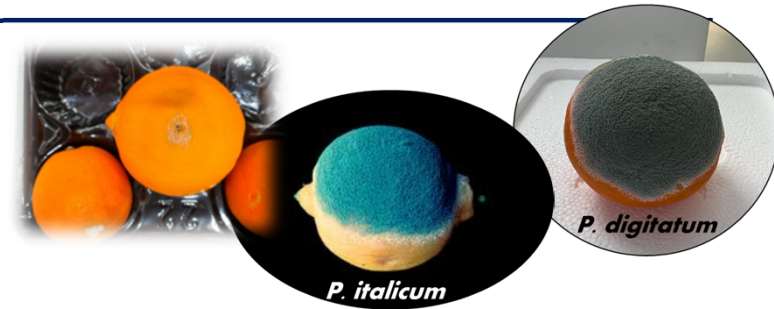
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THE PROBLEM TO BE SOLVED

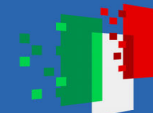
- Detection and identification of plant pathogenic fungi have relevant implications for food safety and human health and require fast and easy-to-handle diagnostic techniques
- Modern technologies used to detect pollutants, including phytopathogens, involve instrumental analysis
- **IMPACT:** Agribusiness, Seed industry, Environmental Protection Agencies, Health Care and Clinical Diagnostics, QC in the Pharmaceutical Field, Water Quality Monitoring
- **State of the art:** Modern technologies use expensive and bulky machines, long analysis times, and specialized personnel.



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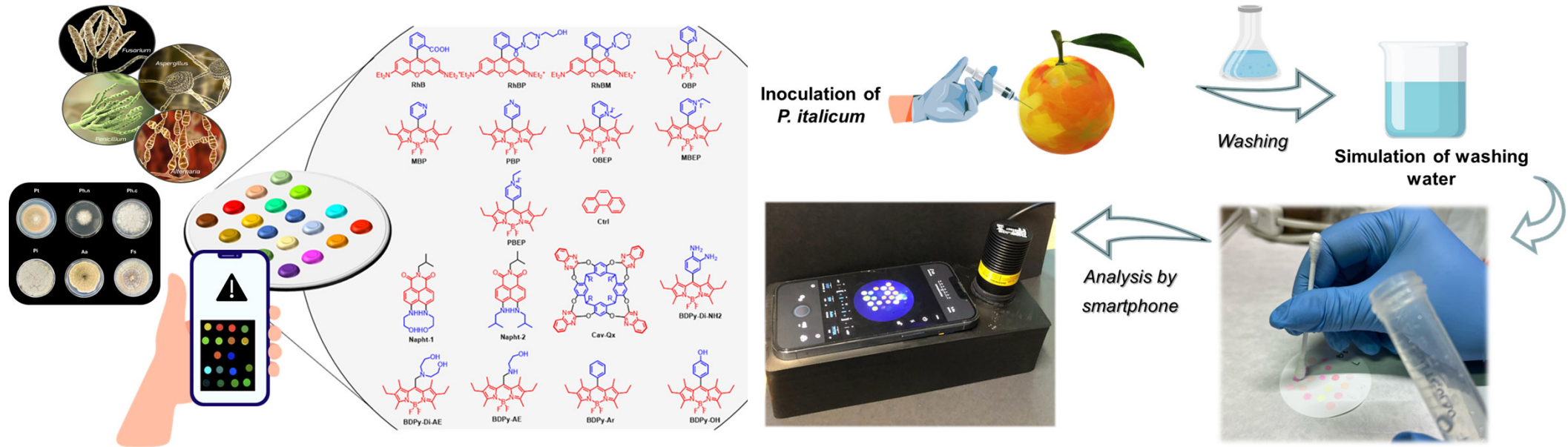


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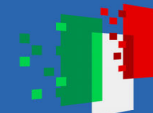
OUR SOLUTION: a Point-Of-Care (POC) method based on an Array System



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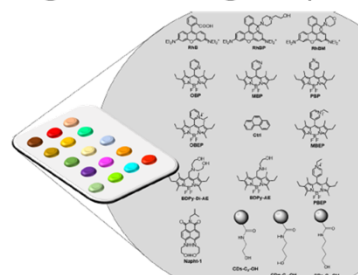
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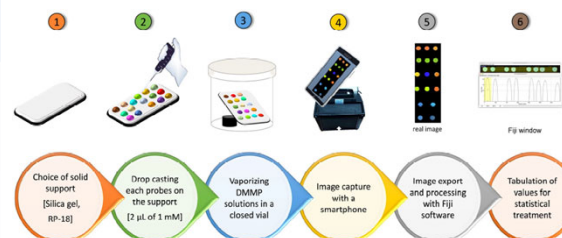
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DEVELOPMENT PLAN UNDER SAMOTHRACE ECOSYSTEM

➤ Background: organophosphate detection by array – TRL 2-3



NAs Classification	Chemical structures
G-Type	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <chem>CC(C)OP(=O)(F)F</chem> Sarin </div> <div style="text-align: center;"> <chem>CC(C)OP(=O)(N)N</chem> Tabun </div> <div style="text-align: center;"> <chem>C1CCN(C1)OP(=O)(F)F</chem> Cyclosarin </div> <div style="text-align: center;"> <chem>CC(C)OP(=O)(F)F</chem> Soman </div> </div>
V-Type	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <chem>CC(C)OP(=O)(N)N</chem> VX </div> <div style="text-align: center;"> <chem>CC(C)OP(=O)(N)N</chem> R-VX </div> </div>



- RSC Adv., 2021, 11, 13047–13050
- ACS Appl. Nano Mat. 2021, 4, 6250
- Chem. Eur. J. 2021, 27, 13715
- ACS Omega 2022, 7, 42, 37122

➤ Work within Samothrace:

- ✓ Synthesis of new probes for pathogens detection
- ✓ Detection of pathogens
 - Linearity range of concentration
 - Selectivity
 - Multivariate analysis
- ✓ Development of an application for smartphone
- ✓ TRL 4

Pathogens detected

- *Penicillium digitatum*
- *Penicillium italicum*,
- *Phytophthora citrophthora*,
- *Phytophthora nicotianae*,
- *Plenodomus tracheiphilus*,
- *Alternaria alternata*,
- *Fusarium sacchari*.

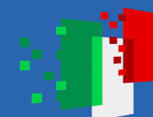
- Sens. Actuat.: B. Chem. 2023, 393, 134305
- Curr. Org. Chem. 2023, 27, 876
- Chemosensors 2023, 11, 503
- ACS Omega 2023, 8, 38038
- ChemPlusChem 2024, e202400098
- Chem. Commun. 2024, 60, 13702



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NEXT STEP UNDER SAMOTHRACE ECOSYSTEM

- Patent: in preparation
- BAC: TD-Group Italia SRL
- *In situ* analyses
- System prototype demonstration in operational environment: Final TRL 7



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Acknowledgements

SAMOTHRACE GROUP

- Prof. Salvo Mirabella
- Prof.ssa Simona Consoli
- Prof.ssa Santa Olga Cacciola
- Prof.ssa Antonella Pane
- Dr.ssa Rossana Parlascino
- Dr. Federico La Spada



UNICT-DSC

- Prof. Andrea Pappalardo
- Prof. Nunzio Tuccitto
- Dr.ssa Alessia Cavallaro
- Dr.ssa Rossella Santonocito



TD Group Italia



UNICT-DMI

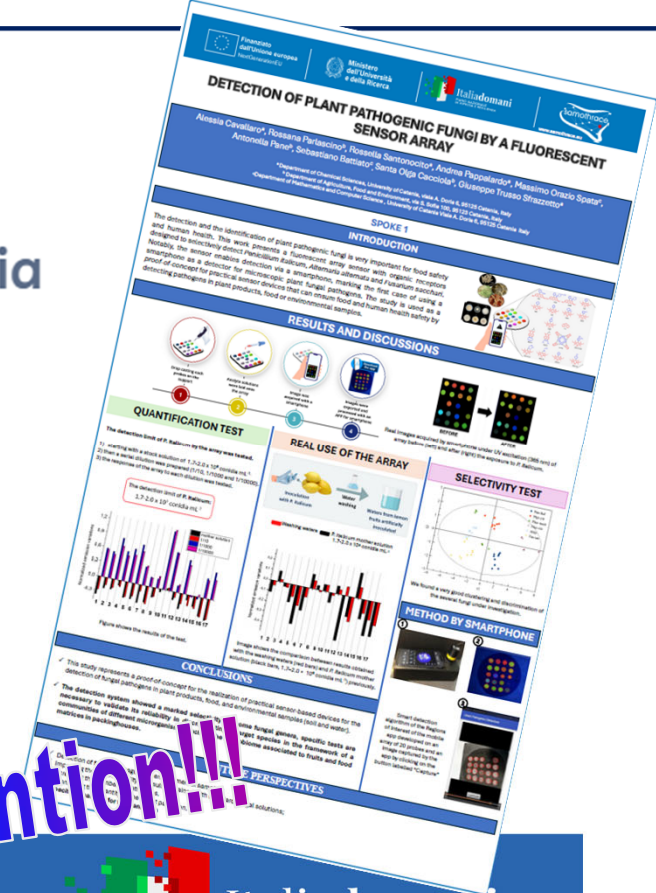
- Prof. Sebastiano Battiato
- Dr. Massimo Spata



UNICT-Brevetto

- Prof. Antonio Terrasi
- Avv. Irene Manganaro

VISIT OUR DEMO AT
BOOTH N. 59



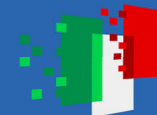
and All of You for your kind attention!!!



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