

Identification of "Defense Primers" using OTR – Boosting the innate immune response for agro & pharma applications

Field of application

Abiotic stress tolerance and pest and disease resistance continue to be the key for the high-yield cultivation of crops. The so-called defense priming is a very effective mechanism for sustainable crop production. This preventive method stimulates the plant's innate immune system by applying defense-priming chemical compounds. Environment-friendly alternatives to pesticides can be used in this approach. These are preferably natural or near-natural compounds that boost the plant's defense capacity (as a single substance or more often as a mixture of active substances).

A method developed by scientists at RWTH Aachen University enables the detection of priming-active compounds that induce defense in a very efficient way. Areas of application include plant protection, but also pharmacological aspects (priming of the human innate immune system as preventive medical measure).

State of the art

Defense primers provide the immune system with the tools required to cope with future stress without direct activation of defense in advance. Therefore, identification of priming compounds is challenging. Current methods are mostly limited to model systems.

Innovation

This method was developed with support of the Excellence Initiative of the DFG and the Hans Hermann Voss Foundation. Addition of priming-active compounds to a plant cell culture immediately increases cell metabolism associated with enhanced breath. This is often accompanied by the synthesis of reactive oxygen species that are well-known mediators of plant defense. Therefore, the priming capacity of potential priming compounds can be disclosed by measuring an increased oxygen transfer rate (OTR). The respiratory activity monitoring system 'RAMOS', which is commercially available on the market, allows for continuous monitoring of the OTR.

RAMOS is a system capable of high-throughput and the method is also suitable for human and animal cells. Consequently, the method and system can be used for the identification of active ingredients in preventive medicine.

Your benefits at a glance

- ✓ Fast and reliable identification of environment-friendly pesticides
- ✓ Independent of a certain cell type
- ✓ Simultaneously recording of the OTR and physiological parameters (e.g. ethylene release)
- ✓ Detect natural and near-natural priming compounds in high-throughput processes
- ✓ Analyze the activity of individual compounds and mixtures of compounds
- ✓ Pharmacological drug identification

Technology transfer

Technologie-Lizenz-Büro GmbH is responsible for the exploitation of this technology and assists companies in obtaining licenses or establishes contacts for development cooperation.

Patent portfolio

EP and US applications (US2017254801 A1) are currently pending.

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Reference number: 13/099TLB