TECHNOLOGY

Novel Method of Inducing Broad Spectrum Disease Resistance in Plants

OVERVIEW

Background

Plant defense systems cannot be adequately activated upon pathogen attack in plants lacking cognate disease resistant (R) genes. Unfortunately, majority of the commercial crop cultivars possess fewer R genes and are generally more susceptible to pathogens compared to their wild relatives. Utilization of R genes in agriculture has three limitations: firstly, introduction of R genes into commercial plants requires time-consuming breeding programs; secondly, most R genes confer resistance to only one or a few strains of a particular pathogen and thirdly, R gene-mediated resistance is often overcome by pathogens in a short period of time.
Protein phosphorylation and dephosphorylation processes are believed to be implicated in the defense signaling cascades controlled by disease resistance genes. However, no phosphatase gene has been shown in the model plant Arabidopsis thaliana (Wall cress) to be directly involved in regulation of plant disease resistance.

Innovative Technology

Researchers at the University of Maryland have developed a method of negatively regulating a plant defense pathway by interfering with the gene expression of the Arabidopsis protein phosphatase type 2C gene, referred to as “defense-associated protein phosphatase typc 2C one” (DAPPI). This strategy of engineering (e.g. up- or down- regulating) key downstream components of the R gene pathway which is highly conserved in crop species, enables induction of disease resistance against a broad-range of pathogens in a more controlled way.

Advantages

1. This method confers disease resistance against a broad-range of pathogens.
2. This technique is highly regulated and does not affect the plant health if pathogen-inducible promoters are used for down-regulation

Applications

1. This method is currently being tested in rice crops and should be applicable to other crop species
2. This technique provided protection against Pseudomonas syringae, Golovinomyces cichoracearum and Hyaloperonospora arabidopsidis

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

US Patent 7,910,801

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Agricultural

EXTERNAL RESOURCES

- US Patent 7,910,801

BI-04-016