Chalcone 3-Hydroxylase: prevention of fire blight
chalcone 3-hydroxylase | molecular breeding | healthy apples | fire blight prevention

The present invention relates to nucleic acid molecules, comprising a nucleotide sequence encoding a polypeptide with chalcone 3-hydroxylase activity.

Background
Fire blight is a devastative bacterial disease mainly on pome fruits and some ornamental plant species and causes major economic losses around the world. Especially for commercial fruit growers, such losses could reach amounts threatening the existence of the company. Since no curative treatment is possible soon after primary infection, mainly preventive protection strategies are possible. Primary fire blight of pome fruit – this means the flower infection of apple and pear trees by honey bees and other pollinators – can be restricted by exogenous application of bactericides. State of the art for this purpose is the use of the antibiotic streptomycin. It is highly active against the fire blight pathogen Erwinia amylovora, but is considered critical with respect to residues regularly found in honey samples, a potential resistance development, and ecological considerations.

Technology
According to the invention it was found out that polypeptides, in particular specific hydroxylases, as for example the rare chalcone 3-hydroxylases, are able to hydroxylate chalcones at position 3. The knowledge of such hydroxylases enables the modulation of the expression of these hydroxylases in order to, for example, overexpress or inhibit these in vivo. In case of the dihydrochalcones, the formation of 3-hydroxychalcone derivatives is promoted, which are involved in the pathogen defence or due to their antioxidant properties have beneficial effects for health, respectively. This approach is dependent on the presence of a precursor mainly found in apple. It could also be tested for other apple diseases.

Benefits
- high antioxidant activity
- increase of the health benefits of apples
- increase of the resistance against plant diseases
- preventing oxidative destruction of plant cells and plant tissue

Potential Applications
- preventing and treating fire blight
- production of healthy apples

Development Status
Prototype development

Status of the IPR
AT, US, JP, NZ patents granted

Cooperation Options
R&D collaboration, license agreement, sale of patent

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