

G. Reuter

MICROBIAL SYNTHESIS OF PHYTOEFFECTORS  
IN THE MICROORGANISM-PLANT INTERACTION\*

Secondary metabolites are involved in the coevolutioner interactions between animals, plants and microorganisms. This view supports the solution of a series of present problems, e.g. the questions of effectors in medicine and agriculture, environmental problems. It results not only in the discovery of new effectors but also in the finding out of growing conditions for increasing effector biosynthesis. Special proteophosphoglycans of microbial cell walls are effectors of the biosynthesis of specific proteins in the antigen-antibody-reaction of animals. Similarly, special unmasked parts of cell wall carbohydrates of microorganisms can react with receptors in plant cells to induce hypersensitive response, phytoalexine-biosynthesis up to death of the infected plant cell or death of the whole plant.

Nutrient concentration and physical conditions (pH, temperature) decisively determine the phytotoxin-biosynthesis: Tentoxin, a cyclic peptide is synthesized by *Alternaria alternata* during the idiophase with low phosphate level. Acetate is a precursor and effector of this biosynthesis. A synthetase catalyzes the nonribosomal peptid biosynthesis. In contrast the phytotoxin-peptide, phaseolotoxin is synthesized by *Pseudomonas phaseolicola* in dependence on temperature and not in dependence on growing phases. The toxin blocks the pathway ornithine-citruline-argini-

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ne-protein in plants and microorganisms by inhibition of ornithine carbamyltransferase (OCT). The gene expression of a constitutive insensitive OCT by the toxinproducer is the presupposition for the gene expression in the biosynthesis of phaseolotoxine. With increased toxin biosynthesis the biosynthesis of insensitive OCT increases. An important key enzyme of phaseolotoxin biosynthesis is a lysine specific amidinotransferase.

WB Mikrobielle Biochemie  
Friedrich-Schiller-Universität  
Jena, DDR

G. Reuter

#### SYNTEZA FOTODEFEKTORÓW PRZEZ MIKROORGANIZMY PODCZAS ICH ODDZIAŁYWAŃ Z ROŚLINAMI

Metabolity wtórne są mediatorami oddziaływań pomiędzy roślinami, zwierzętami i mikroorganizmami. Biosynteza fitotoksyn zależy od stężenia substancji odżywczych i od warunków fizycznych (pH, temperatura). Do fitotoksyn należą: tentotoksyna, syntetyzowana przez *Alternaria alternata* i faszotoksyna wytwarzana przez *Pseudomonas phaseolicola*. Omówiono w pracy działanie i biosyntezę tych fitotoksyn.