REGULATED ALTERNARIOL BIOSYNTHESIS BY *ALTERNARIA ALTERNATA* IS IMPORTANT FOR SUCCESSFUL SUBSTRATE COLONIZATION

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During the colonization process fungi have to interact with the plant tissue. Several plant pathogenic fungi are able to produce mycotoxins. For several of these mycotoxins, like for example the trichothecenes or patulin, it has been shown that they can act as pathogenicity factors supporting the colonization of the respective plant tissue by the fungus. This activity was also demonstrated for alternariol biosynthesis in *A. alternata*. Mutant strains of *A. alternata* not able to produce alternariol had a greatly reduced capacity to colonize tomatoes compared to the wild type. After addition of external alternariol the capacity was re-established in a concentration dependent manner. Because the alternariol biosynthesis by the fungus is important for its colonization, the biosynthesis of alternariol must be carefully controlled to ensure successful colonization. Usually, tomato tissue has a high water activity and a low pH. This means that alternariol biosynthesis must be possible under these conditions. Changes in the osmotic conditions, that mean changes in water activity, are sensed by the HOG signaling cascade pathway, whereas changes in pH are mediated to the transcriptional level by the *pac*C signal transduction system. We could show that both signaling transduction pathways play an important role in ensuring that alternariol is produced at conditions which initially signal optimum substrate conditions. However, after initial colonization, the tomato tissue can defend the colonization by certain inhibitory secondary metabolites. According to our results, chlorogenic acid, a natural component of resistant tomato phenotypes, can inhibit the expression of the alternariol polyketide synthase gene, thereby inhibiting alternariol biosynthesis and further colonization. Moreover, certain other plant secondary metabolites, which occur in tomato tissue, like the polyamines, have a profound, but metabolite specific influence on alternariol biosynthesis. According to these results, a carefully tuned action/reaction between the tomato tissue and the fungus determines if the colonization is successful or not.

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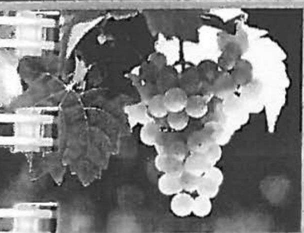

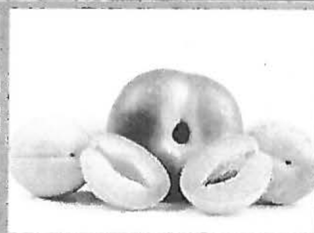

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