Resistance and pathogenicity: how toxins are involved in the carrot-Alternaria dauci interaction

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Résumé en anglais	Leaf blight caused by Alternaria dauci is the most damaging foliar disease on carrots, impeding the mechanic harvest. Fungicides remain the most effective way to control this disease. However, those molecules are expensive, affect environment and could be insufficient. Only partially resistant cultivars are known and marketed but their resistance levels are not sufficient yet, and plant quantitative pathogen resistance mechanisms are poorly characterized. We chose to investigate such mechanisms in the Alternaria dauci – carrot interaction. Previously, several converging experimental results were obtained, showing that fungal toxins take a central place in this interaction (1). toxicity tests performed on carrot cells revealed that only the organic phase of A.dauci exudates is toxic (1). Moreover, a correlation between carrot plant resistance to A. dauci and carrot cells resistance to fungal exudates was found. These results incited us to identify and characterize A.dauci toxin(s) involved in pathogenicity, to decipher their biosynthesis pathway(s) and their regulations. Using HPLC profiles of organic phase exudates from different fungal strains, we uncovered a great variation in toxins production between fungal strains. Furthermore, a new correlation, between aggressiveness of these stains and some fungal exudate's molecules quantities was found, suggesting that toxins production plays a major role in the A.dauci – carrot interaction. We performed extraction and purification of one of the candidate molecules. A toxicity test of this molecule has been achieved with a new protocol of survival quantification. The next step in this project will be the definition of the chemical structure of the candidate molecule and the elucidation of its biosynthesis pathway. To this end, the A.dauci transcriptome data will be used to select genes possibly involved in its biosynthesis pathway.
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