

## THE USE OF SIGS (SPRAY-INDUCED GENE SILENCING) STRATEGY IN THE CONTROL OF *BOTRYTIS CINEREA* IN HORTICULTURAL CROPS

López-Laguna, A.<sup>1,2</sup>, Mota-Maldonado, V.<sup>1,2</sup>, Morales, Y.<sup>1,2</sup>, Pérez-García, A.<sup>1,2</sup>, Fernández-Ortuño D.<sup>1,2</sup>

1. Dpto. de Microbiología, Facultad de Ciencias, Universidad de Málaga, Málaga, Spain,  
2. Área de Protección de Cultivos, Instituto de Hortofruticultura Subtropical y Mediterránea (IHSM-UMA-CSIC) “La Mayora” , Málaga, Spain

The causal agent of the gray mold disease, *Botrytis cinerea*, is one of the main limiting factors of horticultural crops production worldwide. Its control is very dependent on the use of fungicides; however, due to the ability of this pathogen to develop resistance and the new European legislation regarding the reduction of fungicide diversity available for grower in the next years, new advances and technologies are needed to control this important harvest and postharvest disease.

In this study, the potential of the RNA interference (RNAi) technology known as "spray-induced gene silencing" (SIGS) as an alternative for the management of *B. cinerea* was explored. For this purpose, a double-stranded RNA (dsRNA) molecule was designed to target the transcription factor *mrr1*, which is involved in the overexpression of the ABC transporters (drug efflux transporters) and the resistance to several commercial fungicides. To test the efficacy of *mrr1*-dsRNA, dsRNA uptake by the fungus, sensitivity assays (effect on conidia germination, detached leaf, and fruit assays), fungal biomass analysis and gene expression studies were carried out. The results showed that the fungus was able to uptake it, reducing the conidia germination of the pathogen. Subsequently, it was shown, in *in vivo* assays performed on tomato leaves and apple fruit, that the application of *mrr1*-dsRNA downregulated *mrr1* gene expression and its silencing produced a significantly reduction of *B. cinerea* development, resulting in a reduction of the fungal biomass.

These results demonstrated the potential of the SIGS strategy for the control of *B. cinerea* and *mrr1*-dsRNA as a new molecule with fungicide activity that could be included into the several strategies carried out for sustainable plant protection control programs in the field.

This publication is part of the I+D+i projects PY20\_00048 (PAIDI 2020) and PID2022-136240OB-C21, funded by MCIN/AEI/10.13039/501100011033/FEDER, UE.