What is this research about?
This research is about a plant that is a close relative to the common tobacco plant. The plant’s scientific name is *N. benthamiana*. There is a fungus that infects tobacco plants and the plant studied in this research. That fungus is called *C. orbiculare* and it causes a plant disease called anthracnose. The aim of the research was to evaluate induction and priming of gene expression for 3 chemical activators: BTH, (2R,3R)-butanediol, and PC1. Activators are recognized by the plant and cause defence mechanisms to be induced. In this study, the activators affect the plant’s gene expression and this is what causes the defence mechanism that protects the plant against the fungus.

What you need to know:
The interaction between the fungus *C. orbiculare* and the plant *N. benthamiana* was used to evaluate gene induction and gene priming mechanisms. Three activators were tested: BTH, (2R, 3R)-butanediol, and PC1. All compounds had an affect on the plant gene expression and were able to create resistance to the fungus to varying degrees.

What did the researchers do?
The *N. benthamiana* plants were grown and treated with 1 of the 3 activators (BTH, (2R,3R)-butanediol, or PC1). BTH was applied to the plant’s leaves and the other 2 compounds were applied to the soil. The fungus *C. orbiculare* was sprayed on the plant leaves several days after the activators were applied.

How can you use this research?
Seed/pesticide producers can use this research to further their knowledge about the products related to this area in order to choose plant defense activators that have different modes of action.
The level of disease on the plants was measured by counting the number of lesions per leaf. The leaves of the plants were also collected at various times after they were sprayed with the fungus. Genes from the leaves were analyzed for their gene expression.

What did the researchers find?
All 3 of the activators created resistance to the fungus in the N. benthamiana plant. This means that the severity of anthracnose disease caused by the fungus was reduced. The activators all reduced the number of lesions per leaf caused by the fungus. BTH activated one type of resistance, while (2R,3R)-butanediol and PC1 activated another type of resistance. This could be seen by the differences in the plant’s genes that showed changes in expression.

Keywords:
Collectotrichum obiculare, ISR, pathogenesis-related protein, priming of gene expression, SAR, tobacco

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