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Combining various biological methods to control powdery mildew of tomato

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Various biological methods, mainly based on the utilization of antagonistic microorganisms or plant extracts, have been studied to control powdery mildews. The hyperparasite fungus *Ampelomyces quisqualis* (AQ-10, De Sangosse) is registered in many countries to control powdery mildew on various crops, including *Oidium neolycopersici* on tomato in France. A plant extract from orange (Prev-Am, Vivagro) is registered to control powdery mildew and whitefly on various crops but its effect on tomato powdery mildew is not clearly established. Spray of soluble carbohydrates on leaves of various plant species proved to have an effect against some plant pests but their effect against plant pathogens is not well known, except for trehalose against powdery mildew of wheat.

The objectives of this study were (1) to test the effect of spraying low concentration of sugars (glucose, fructose, sucrose, trehalose) on leaves of tomato against *O. neolycopersici* in controlled conditions and (2) to evaluate the effect of sucrose, AQ-10 and Prev-Am separately and in combinations in semi-commercial tunnel conditions.

Results revealed that spray of sugars on tomato leaves have no significant effect against powdery mildew in controlled conditions. In tunnels, the plant extract Prev-am showed a significant effect against *Oidium neolycopersici* on tomato. Combination of products did not enhance the efficacy of a single product. The relevance of these results to ensure the control of powdery mildew on tomato without fungicides will be discussed.



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