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Content

DETERMINATION OF HYDROGEN CYANIDE PRODUCING STRAINS AS POTENTIAL BIOCONTROL AGENTS

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Introduction: Hydrogen cyanide (HCN) is a volatile secondary metabolite synthesized by some bacteria, and this ability enables their activity against various pathogens. The aim of this study was to identify HCN-producing bacteria and investigate their biocontrol potential.

Methods: Three HCN-producing strains were detected in a collection of bell pepper plant isolates using a semi-quantitative assay with picric acid. The presence of *hcnABC* operon genes was confirmed by PCR. The biological control potential of the HCN-producing strains was tested against three fungal (*Fusarium oxysporum, Rhizoctonia solani, Verticillium dahliae*) and eight bacterial (genera *Xanthomonas, Pseudomonas* and *Clavibacter*) pathogens of bell pepper plants in a split-section Petri dish experiment. The potential nematocidal activity was demonstrated by using the *Caenorhabditis elegans* AU37 strain, with temperature-sensitive sterility and enhanced sensitivity to pathogens.

Results: Detailed characterization of 300 isolates from our collection revealed that we have three different HCN-producing strains identified as *Bacillus subtilis, Pseudomonas moraviensis*, and *P. putida*, with *P. putida* A32 being the most potent. This strain is used for the deletion of the *hcnB* gene to confirm HCN as a biocontrol agent.

Conclusion: The HCN-producing strains showed biocontrol potential against bacteria, fungi, and nematodes. It is concluded that the biological control activity is the result of a volatile metabolite diffusing through the air. Our future experiments will confirm the role of HCN in biological control by generating an HCN deletion mutant.

Key words: plant pathogens; hydrogen cyanide (HCN); biological control

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