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In vitro and field evaluation of selected spices as botanical fungicide for management of Phytophthora infestans, causative agent for late blight in tomato

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In vitro and field evaluation of selected spices as botanical fungicide for management of Phytophthora infestans, causative agent for late blight in tomato

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Abstract

Late blight of tomato, caused by Phytophthora infestans, is responsible for massive losses in yield of open field-grown tomato and is managed by use of synthetic fungicides. The rising demand for food safety calls for alternative yet effective crop protection products. Using a bioassay-guided approach the antifungal properties of ethanolic extracts of seven spices was evaluated and the constituents of the most inhibitory fraction determined using coupled gas chromatography-mass spectrometry. Clove extract was the most active and inhibited (100%) growth of P. infestans followed by black pepper (91%) turmeric (87%) and ginger (85%). The hexane fraction of clove extract equally inhibited growth of P. infestans 100%. The spice extracts reduced severity of late blight by between 29% and 40% with black pepper being the most efficacious under field conditions. These findings show the fungicidal potential of selected spices for the management of late blight of tomato.

Keywords

Botanical fungicide; Bioactive compounds; Gas chromatography-mass spectrometry; phytopathogen