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ISBN: 978-1-83962-516-9

Diagnostics of Plant Diseases

Edited by Dmitry Kurouski

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Abstract

Among the plant pathogens, around 85% of diseases in plants are caused by fungi. Rapid and accurate detection of fungal phytopathogens up to the species level is crucial for the implementation of proper disease control strategies, which were previously relied on conventional approaches. The conventional identification methods have been replaced by many rapid and accurate methods like high throughput sequencing, real-time polymerase chain reaction (PCR), serological and spectroscopic technique. Among these rapid pathogen detection techniques, spectroscopy is a rapid, cost-effective, non-destructive method and does not require sample preparation. Nowadays, visible, infrared and near-infrared rays are commonly employed for pathogen detection. Fluorescence Spectroscopy, Nuclear Magnetic Resonance (NMR) spectroscopy, Fourier Transform Infrared (FTIR) spectroscopy, Attenuated Total Reflection (ATR)-FTIR spectroscopy, Raman Spectroscopy, Matrix-assisted Laser Desorption Ionization Time-Of-Flight Mass Spectrometry (MALDI-TOF MS). Biocontrol fungus-like *Trichoderma* spp. can be detected with the help of MALDI-TOF MS. Fluorescence spectroscopy used fluorescence emanating from the sample and successfully used in the detection of powdery mildew (*Blumeria graminis*). Hyperspectral imaging is an advanced approach which uses artificial intelligence in plant disease detection. This literature discusses briefly about the features of above-mentioned spectroscopy techniques which may impel the general understanding and propel the research activities.

Keywords

diagnosis

fluorescence spectroscopy

fungal plant pathogens

infrared

near-infrared

spectroscopic techniques

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