

Phytotoxic compounds of *Alternaria alternata*

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Abstract

Alternaria alternata is a widely distributed fungal species associated with numerous agricultural crops and plant diseases. In addition to causing infection through direct colonization of plant tissues, the fungus produces a variety of secondary metabolites that can contribute to disease development through phytotoxic effects. This study focuses on the phytotoxic compounds produced by *Alternaria alternata* and their potential role in plant–pathogen interactions. The fungus is known to produce several biologically active metabolites, including host-specific and non-host-specific toxins, depending on the strain, host plant, and environmental conditions. Important metabolites reported from *A. alternata* include alternariol, alternariol monomethyl ether, tenuazonic acid, tentoxin, and other related secondary metabolites. These compounds may interfere with essential physiological and biochemical processes in plants, including membrane integrity, photosynthesis, respiration, enzyme activity, and cellular metabolism. Their production can contribute to symptoms such as chlorosis, necrosis, growth inhibition, and tissue damage. The quantity and composition of phytotoxic metabolites may vary with fungal genotype, culture conditions, nutrient availability, and host association. Understanding these compounds is important for explaining the pathogenicity and ecological behaviour of *A. alternata* and for developing effective strategies for disease management. Investigation of fungal metabolites may also provide useful information for identifying potential biomarkers of infection and developing biological or chemical approaches to control fungal diseases. Further studies are required to characterize the mechanisms of action, biosynthetic pathways, and plant responses associated with these phytotoxic compounds.

Keywords: *Alternaria alternata*, phytotoxic compounds, fungal toxins, secondary metabolites, alternariol, tenuazonic acid, tentoxin, phytotoxicity, plant pathogen, plant disease.