

Influence of zygomycete-derived D'orenone on IAA signaling in Tricholoma-spruce ectomycorrhiza.

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Abstract

Despite the rising interest in microbial communication, only few studies relate to mycorrhization and the pool of potential morphogenic substances produced by the surrounding soil community. Here, we investigated the effect exerted by the C18- ketone β -apo-13-carotenone, D'orenone, on the ectomycorrhizal basidiomycete *Tricholoma vaccinum* and its symbiosis with the economically important host tree, spruce (*Picea abies*). D'orenone is an early intermediate in the biosynthesis of morphogens in sexual development of mucoromycetes, the trisporoids. In the ectomycorrhizal fungus *T. vaccinum*, D'orenone increased the production and/or release of the phytohormone indole-3-acetic acid (IAA) which had been proposed to be involved in the mutual symbiosis. The induced expression of the fungal aldehyde dehydrogenase, Ald5 is associated with IAA synthesis and excretion. In the host tree, D'orenone modulated root architecture by increasing lateral root length and hypertrophy of root cortex cells, likely via changed IAA concentrations and flux. Thus, we report for the first time on carotenoid metabolites from soil fungi affecting both ectomycorrhizal partners. The data imply a complex network of functions for secondary metabolites which act in an inter-kingdom signaling in soil.

Identifier

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