# Bacteria-induced production of the antibacterial sesquiterpene lagopodin B in Coprinopsis cinerea.

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Details

**Abstract**

Fungi defend their ecological niche against antagonists by producing antibiosis molecules. Some of these molecules are only produced upon confrontation with the antagonist. The basidiomycete *Coprinopsis cinerea* induces the expression of the sesquiterpene synthase-encoding gene *cop6* and its two neighboring genes coding for cytochrome P450 monooxygenases in response to bacteria. We further investigated this regulation of cop6 and examined if the gene product is involved in the production of antibacterials. Cell-free supernatants of axenic cultures of the Gram-positive bacterium *Bacillus subtilis* were sufficient to induce *cop6* transcription assessed using a fluorescent reporter strain. Use of this strain in a microfluidic device revealed that the *cop6* gene was induced in all hyphae directly exposed to the supernatant and that induction occurred within less than one hour. Targeted replacement of the *cop6* gene demonstrated the requirement of the encoded synthase for the biosynthesis of the sesquiterpene lagopodin B, a previously reported antibacterial compound from related species. Accordingly, lagopodin B from C. cinerea inhibited the growth of several Gram-positive bacteria including *B.* subtilis but not Gram-negative

bacteria. Our results demonstrate that the *C. cinerea* vegetative mycelium responds to soluble compounds of a bacterial culture supernatant by local production of an antibacterial secondary metabolite.

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