

Biosynthesis of the respiratory toxin bongkreikic acid in the pathogenic bacterium Burkholderia gladioli.

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Abstract

Bongkreikic acid (BA), an infamous respiratory toxin of the pathogenic bacterium *Burkholderia gladioli*, causes lethal intoxications when tempe bongkrek is produced with contaminated *Rhizopus oligosporus* cultures. Genome sequencing of *B. gladioli* pathovar *cocovenenans* unveiled the genetic basis for BA biosynthesis, and pointed to a homologous *bon* gene cluster in a *B. gladioli* strain from an infected rice plant. For functional genetics in *B. gladioli* λ Red recombination was established. Dissection of the modular type I polyketide synthase (a trans-AT PKS) provided insights into complex polyketide assembly. Isoprenoid-like β -branching events and a six-electron oxidation of a methyl group to a carboxylic acid give rise to the unique branched tricarboxylic fatty acid. The role of the cytochrome P450 monooxygenase, *BonL*, was proven by structural elucidation of deoxybongkreikic acid from a mutant.

Involved units

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