Discovery of an Extended Austinoid Biosynthetic Pathway in *Aspergillus calidoustus*.


Abstract

Filamentous fungi produce a wide range of natural products that are commonly used in various industrial contexts (e.g., pharmaceuticals and insecticides). Meroterpenoids are natural products of interest because of their various biological activities. Among the meroterpenoids, there is a group of insecticidal compounds known as the austinoids. These compounds have also been studied because of their intriguing spiro-lactone ring formation along with various modifications. Here, we present an extension of the original austinol/dehydroaustinol biosynthesis pathway from *Aspergillus nidulans* in the recently identified filamentous fungus *Aspergillus calidoustus*. Besides the discovery and elucidation of further derivatives, genome mining led to the discovery of new putative biosynthetic genes. The genes involved in the biosynthesis of later austinoid products were characterized, and among them was a second polyketide synthase gene in the A. calidoustus cluster that was unusual because it was a noninterative polyketide synthase producing a diketide. This diketide product was then loaded onto the austinoid backbone, resulting in a new insecticidal derivative, calidodehydroaustin.

Involved Units and Groups

Biomolecular Chemistry  Molecular and Applied Microbiology  Systems Biology and Bioinformatics  National Reference Center for Invasive Fungal Infections  Biobricks of Microbial Natural Product Syntheses

HKI-Authors

Prof. Dr. Axel A. Brakhage  Prof. Dr. Christian Hertweck  Dr. Vito Valiante  Dr. Derek J. Mattern  Prof. Dr. Reinhard Guthke  Dr. habil. Markus Nett  Dr. Fabian Horn  Dr. Kirstin