Investigation of a 6-MSA Synthase Gene Cluster in Aspergillus aculeatus Reveals 6-MSA-derived Aculinic Acid, Aculins A-B and Epi-Aculin A - DTU Orbit (22/12/2018)

Investigation of a 6-MSA Synthase Gene Cluster in Aspergillus aculeatus Reveals 6-MSA-derived Aculinic Acid, Aculins A-B and Epi-Aculin A

Aspergillus aculeatus, a filamentous fungus belonging to the Aspergillus clade Nigri, is an industrial workhorse in enzyme production. Recently we reported a number of secondary metabolites from this fungus; however, its genetic potential for the production of secondary metabolites is vast. In this study we identified a 6-methylsalicylic acid (6-MSA) synthase from A. aculeatus, and verified its functionality by episomal expression in A. aculeatus and heterologous expression in A. nidulans. Feeding studies with fully $^{13}$C-labeled 6-MSA revealed that 6-MSA is incorporated into aculinic acid, which further incorporates into three compounds that we name aculins A and B, and epi-aculin A, described here for the first time. Based on NMR data and bioinformatic studies we propose the structures of the compounds as well as a biosynthetic pathway leading to formation of aculins from 6-MSA.

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