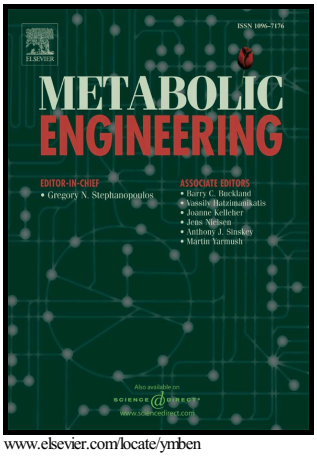

www.elsevier.com/locate/ymben

Characterization and engineering of a carotenoid biosynthesis operon from *Bacillus megaterium*

Philip Hartz, Mohammed Milhim, Sandra Trenkamp, Rita Bernhardt, Frank Hannemann

PII: S1096-7176(18)30172-1
DOI: https://doi.org/10.1016/j.ymben.2018.07.017
Reference: YMBEN1446

To appear in: *Metabolic Engineering*

Received date: 26 April 2018
Revised date: 11 July 2018
Accepted date: 24 July 2018

Cite this article as: Philip Hartz, Mohammed Milhim, Sandra Trenkamp, Rita Bernhardt and Frank Hannemann, Characterization and engineering of a carotenoid biosynthesis operon from *Bacillus megaterium*, *Metabolic Engineering,* https://doi.org/10.1016/j.ymben.2018.07.017

Characterization and engineering of a carotenoid biosynthesis operon from *Bacillus megaterium*

Philip Hartz[1], Mohammed Milhim[1], Sandra Trenkamp[2], Rita Bernhardt[1] and Frank Hannemann[1*]

[1]Department of Biochemistry, Campus B2.2, 66123, Saarland University, Saarbrücken, Germany

[2]Metabolomic Discoveries GmbH, Am Mühlenberg 11, 14476 Potsdam, Germany

***Correspondence:** F. Hannemann, Department of Biochemistry, Saarland University, Campus B 2.2, 66123 Saarbrücken, Germany. Tel: +49 681 302 6671, E-mail: f.hannemann@mx.uni-saarland.de

Abstract:

Bacillus megaterium belongs to the group of pigmented bacilli producing carotenoids that ensure self-protection from UV radiation-induced and collateral oxidative damage. Metabolite profiling of strain MS941 revealed the presence of the C30 carotenoids 4,4'-diapophytofluene and 4,4'-diaponeurosporenic acid. A gene function analysis demonstrated the presence of a corresponding C30 carotenoid biosynthetic pathway with pharmaceutical importance. We identified a gene cluster comprising putative genes for a farnesyl diphosphate synthase (IspA), a diapophytoene synthase (CrtM) and three distinct diapophytoene desaturases (CrtN1-3). Intriguingly, *crtM* was organized in an operon together with two of the identified *crtN* genes. The individual activities of the encoded enzymes were determined by