

## Growth and Lipopeptide Production by *Bacillus subtilis* OG in Landy's Medium Supplemented with Arginine

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*Bacillus subtilis* is the source of important antifungal peptides produced nonribosomally by the cooperative action of specific nonribosomal peptide synthetases. This class of megasynthases is also involved in the biosynthesis of other important secondary metabolites with medical applications, such as the penicillins and cyclosporins. The aim of this work is to show that *Bacillus subtilis* OG is able to grow and produce specific lipopeptides, under low oxygen, in Landy's medium supplemented with nitrate and arginine. Results of high performance liquid chromatography (HPLC) and antimicrobial activity demonstrate the production of iturin, surfactin and fengycin. Although these lipopeptides have been shown to present antifungal activity, we also report their antibacterial properties, especially when more than one class is present. We have previously shown that a mixture of iturin and surfactin produces dramatic changes in microbial cell morphologies in a study using atomic force microscope (AFM). Here, the antibacterial properties of lipopeptides was demonstrated against *Escherichia coli* and against the marine cyanobacteria *Synechococcus elongatus*. We conclude that *B. subtilis* OG is able to grow and produce lipopeptides under low oxygen conditions. Given that the HPLC analysis demonstrates an induction of specific lipopeptide biosynthesis, when arginine is used as the sole organic nitrogen, it is assumed that this amino acid has stimulated the growth and production of fengycins, a family of nonribosomal lipopeptides bearing an ornithine residue in the structure. This conclusion is based on the assumption that arginine is converted by specific enzymes into ornithine, a potentially limited precursor of fengycin biosynthesis.

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