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Inhibition of biofilm formation in *Bacillus subtilis* by new halogenated furanones

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Abstract

© 2015 Japan Antibiotics Research Association All rights reserved. Gram-positive bacteria can cause various infections including hospital-acquired infections. While in the biofilm, the resistance of bacteria to both antibiotics and the human immune system is increased causing difficulties in the treatment. *Bacillus subtilis*, a non-pathogenic Gram-positive bacterium, is widely used as a model organism for studying biofilm formation. Here we investigated the effect of novel synthesized chloro- and bromo-containing 2(5H)-furanones on biofilm formation by *B. subtilis*. Mucobromic acid (3,4-dibromo-5-hydroxy-2(5H)-furanone) and the two derivatives of mucochloric acid (3,4-dichloro-5-hydroxy-2(5H)-furanone) - F8 and F12 - were found to inhibit the growth and to efficiently prevent biofilm formation by *B. subtilis*. Along with the low production of polysaccharide matrix and repression of the *eps* operon, strong repression of biofilm-related *yqxM* also occurred in the presence of furanones. Therefore, our data confirm that furanones affect significantly the regulatory pathway(s) leading to biofilm formation. We propose that the global regulator, Spo0A, is one of the potential putative cellular targets for these compounds.

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