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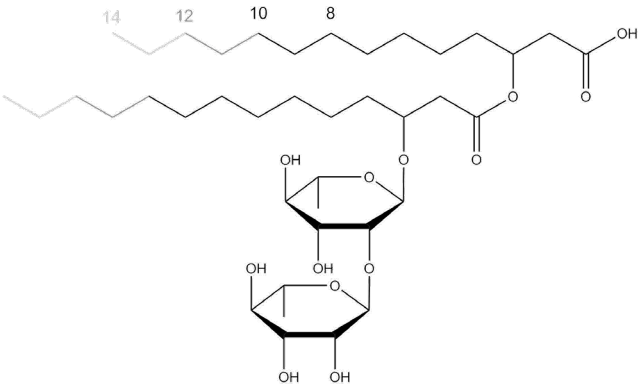
Designer rhamnolipid production

Rhamnolipids are biosurfactants featuring surface-active properties that render them suitable for a broad range of applications in bioremediation and crop science. These properties include their emulsification and foaming capacity, critical micelle concentration, and ability to lower surface tension. Further, aspects like biocompatibility and environmental friendliness are becoming increasingly important. Rhamnolipids are mainly produced by pathogenic bacteria like Pseudomonas aeruginosa. We previously designed and constructed a recombinant Pseudomonas putida KT2440, which synthesizes rhamnolipids by decoupling production from host-intrinsic regulations and cell growth. Rhamnolipids as most biosurfactants are synthesized in mixture. We here show our approach to alter the native mixture of surfactant molecules to produce specific new-to-nature combinations. The molecular structure can on the one hand be altered in the hydrophilic moiety by changing the number of rhamnose molecules. We achieved this by using only distinct genes from the native rhamnolipid synthesis pathway. On the other hand, we were also able to change the length of the fatty acids in the hydrophobic part. This chain length is determined by the acyl-transferase (RhlA). Using genes from different organisms enables our microbial cell factory to synthesize molecules with different chain lengths.



Biography

Till Tiso has completed his PhD in 2016 at RWTH Aachen University. After his Postdoctoral studies at RWTH Aachen University and a couple of research stays at Imperial College, London and CIB-CSIC, Madrid, he is now a Research group Leader at the institute of applied microbiology (iAMB) at the RWTH Aachen University. He has published more than 10 papers in reputed journals.

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