

Kick-off session: "Biotechnology for a sustainable bioeconomy"



Project name: Synthetic Biology for the development
of novel, cheap and efficient biosurfactants

Project acronym: BestBioSurf

Name: Prof. Philippe Jacques



This project has received funding from the European Union's Horizon
2020 research and innovation programme under grant 722361

Frankfurt am Main, 13.06.2018



- Microbial Processes and Interactions Team, Biophysics Team and Products, Environment and Processes Team, TERRA Teaching and Research Centre, **Gembloux AgroBioTech-University of Liege**, Belgium



- Bioinformatics Group and Wageningen Marine Research / Marine Animal Ecology Group , **Wageningen University and Research**, The Netherlands



- Microbiology Department, Institute of Molecular Biology of Rosario, **UNR**, Argentina



- Pharmaceutical Biology Department, Pharmaceutical Institute, **Eberhard Karls University of Tuebingen**, Germany



- **Lipofabrik Belgium**, Belgium
- **Dasic International Ltd**, United Kingdom
- **BioWanze**, Belgium (Associate partner)



- Total project budget: 1460 k€
- Requested budget : 1257 k€
- Project start: May, 1, 2018

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journal homepage: www.elsevier.com/locate/marpolbul

Oil spill dispersants induce formation of marine snow by phytoplankton-associated bacteria

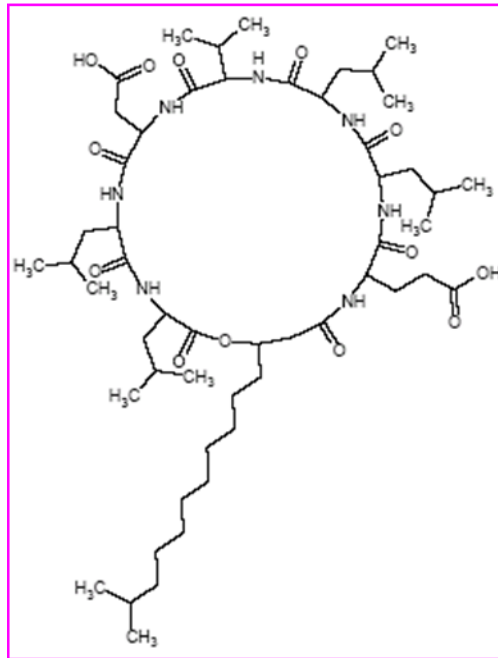
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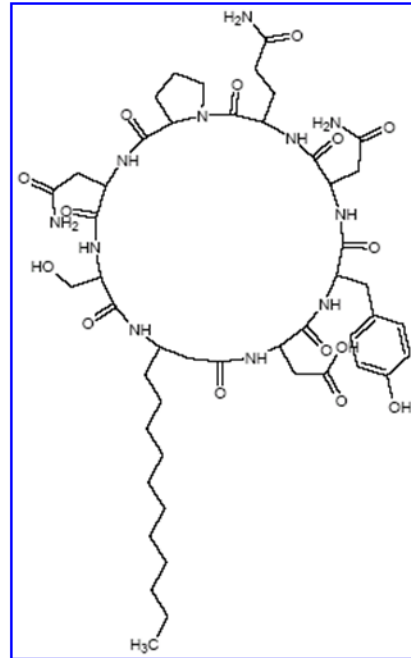
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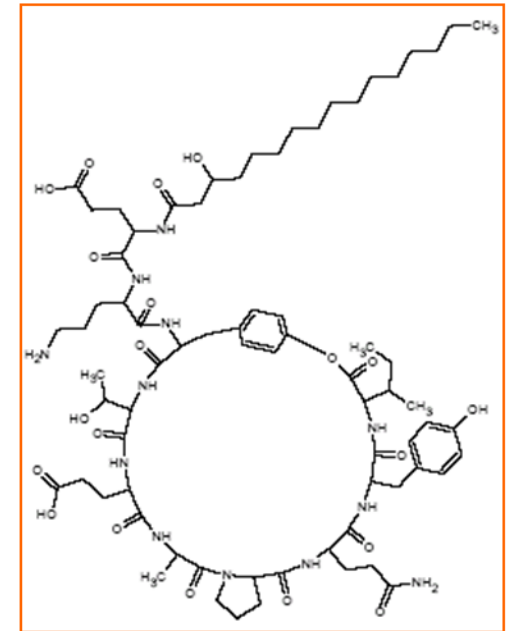
Surfactins



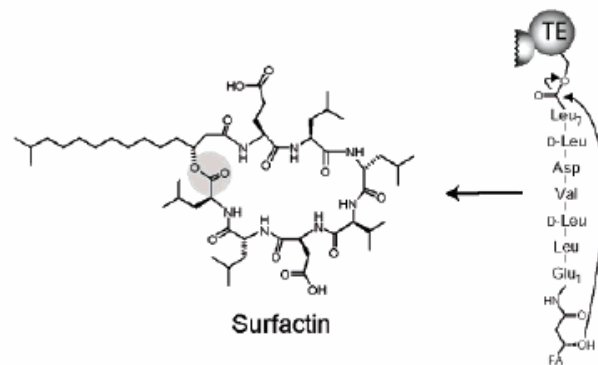
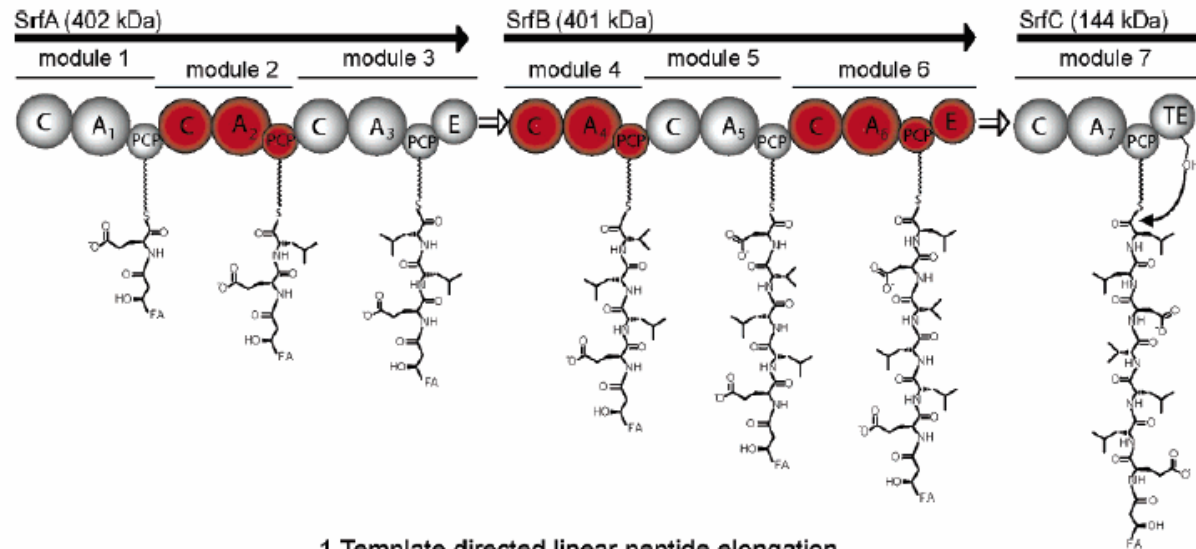
Iturins (Mycosubtilin)



Fengycins Plipastatins



JACQUES P. In: *Biosurfactants, Microbiology Monographs 20*,
G. Soberon-Chavez (ed.), Springer-Verlag Berlin Heidelberg, Germany. pp. 57-91, 2011.



- Project objectives

BestBioSurf project aims at producing **novel** and **eco-friendly biosurfactants** in a **cost-effective** manner through lab-scale validation to a **bio-process demonstrator** within a real environment.

- Scientific approach and project topic area

- *Bacillus subtilis* host-based system
 - novel strategy combining bioinformatics, synthetic biology and metabolic engineering
- => diversification of bio-surfactants (potent but eco-friendly)
- => development of an upscaled production process

Tools



Targets

Workshop

Scientific publications,
conferences

Newsletters

Website

Leaflets, press release

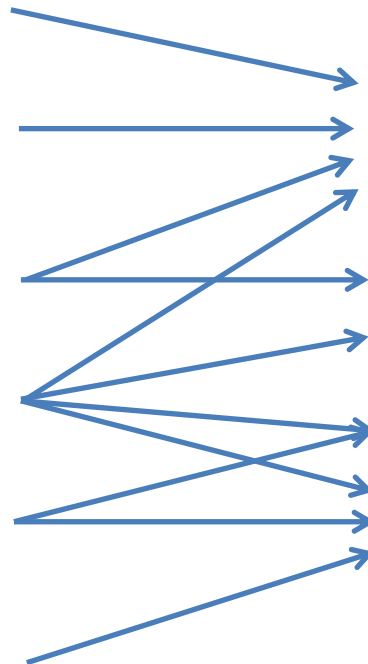
Outreach activities

Key players: industrial partners,
researchers

Subjects/Defenders: NGO

Context setters: funders, department

Crowd/bystanders



Supply

Co-product



Development

Bioinformatics tools

Structure/function prediction



Genome mining



Cell factory



Lipid metabolism

Amino acids metabolism



Novel synthetases

Scale-up

Bioprocess scale-up



Production

Biosurfactant production



End users



Exploitation of project results :

Supply of bioethanol co-products for biosurfactant production

Open-source softwares

Licensing of patent on novel synthetase

Increase knowledge on lipid and amino acids metabolism

Process development

Full scale biosurfactant production

Sale of lipopeptide compounds

- *What is proposed*

A novel and original strategy based on bioinformatics, synthetic biology and metabolic engineering to get novel biosurfactants

- *What should be achieved*

To design new lipopeptide synthetases

To design new biosurfactants with high efficacy, low toxicity and high biodegradability

To get a cell factory adapted to a cheap substrate

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THANK YOU FOR YOUR ATTENTION