



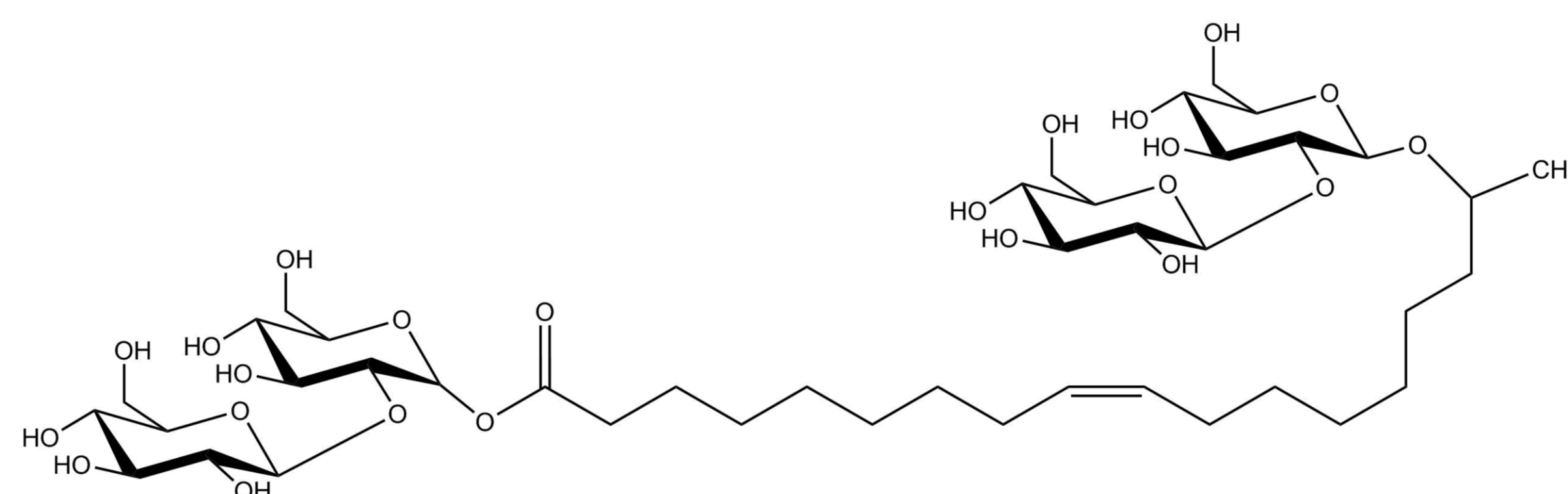
Boosting the production of innovative bola amphiphiles by applying integrated omics analyses.

Sven Dierickx^{1,2}, Wim Soetaert¹, Lynn Vanhaecke²

¹ Centre for Industrial Biotechnology and Biocatalysis (InBio.be), Faculty of Bioscience Engineering, Ghent University, Belgium
² Lab of chemical analysis (LCA), Faculty of Veterinary Medicine, Ghent University, Belgium

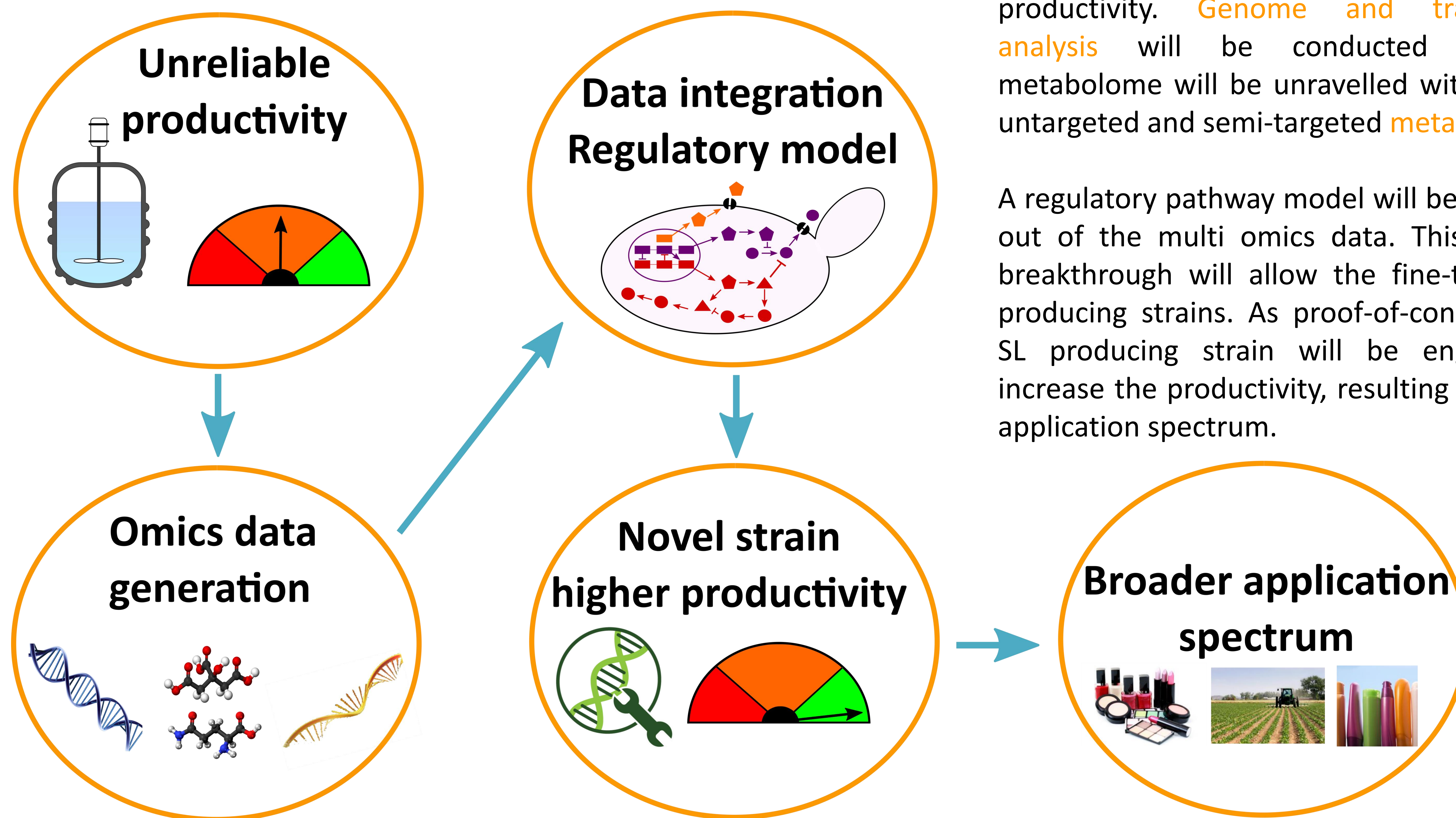
Introduction

Bio-degradable and bio-based surface-active agents are a renewable and environmentally friendly alternative to petroleum derived or oleochemical surfactants. A prime example are **bolaform sophorolipids** (bola SL) produced by *Starmerella bombicola*, these molecules can be applied in cosmetics, pharma, nanotechnology, detergent industry, ... [1]



Recent research demonstrated that there is a high market interest for bola SL but production cost is currently too high to be economically sustainable for all applications and the productivity has the largest impact on the production cost [2]. Though process development already made some improvements, **strain improvement** is absolutely necessary. However, this development needs **more fundamental in-depth information** about the biosynthesis of these molecules by *Starmerella bombicola* and its regulation.

Strategy



A comparative **multi omics approach** will be used to unravel the effects of certain genes and compounds that have an impact on the productivity. **Genome and transcriptomic analysis** will be conducted while the metabolome will be unravelled with the aid of untargeted and semi-targeted **metabolomics**.

A regulatory pathway model will be constructed out of the multi omics data. This knowledge breakthrough will allow the fine-tuning of SL producing strains. As proof-of-concept, a bola SL producing strain will be engineered to increase the productivity, resulting in a broader application spectrum.

References

- [1] Van Bogaert, I., Buyst, D., Martins, J., Roelants, S. L., & Soetaert, W. (2016). Synthesis of bolaform biosurfactants by an engineered *Starmerella bombicola* yeast. *BIOTECHNOLOGY AND BIOENGINEERING*, 113(12), 2644–2651.
- [2] unpublished results, FP7 project 'IB2Market' (Nr. 613937)

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