## 12<sup>th</sup> International Congress on

## **Microbial Interaction and Applications of Beneficial Microbes**

July 17-18, 2017 Munich, Germany

## Engineered yeast and microalgae mutualism for the potential bioremediation of winery waste water

Zoë Faith Simpson, Rene Naidoo and Florian F Bauer Stellenbosch University, South Africa

icroalgae are the most efficient producers of biomass used for the production of a wide variety of biofuels and bio-products (animal feeds, omega fatty acids and carotenoids). However, most production processes utilize monoculture systems which by nature are unstable and prone to contamination. Synthetic microbial ecology offers a solution to this problem as multi-species ecosystems comprised of organisms with complementary metabolic capabilities can be designed to enhance productivity and minimize losses due to biological contamination. These multispecies ecosystems also provide more functionalities and environmental resilience, but are of limited usefulness as they remain difficult to control. To overcome this drawback, we propose the use of synthetic ecology principles such as species specific selection and engineered symbiosis to engineer stable associations between evolutionarily unrelated organisms previously isolated from winery wastewater. The specific aim of this study was to establish a stable synthetic mutualism between yeast, Saccharomyces cerevisiae and microalgae, Parachlorella beijerinckii under strongly selective conditions, based on the reciprocal exchange of carbon and nitrogen. The stability of these associations was evaluated at different temperatures and pH, as these are key parameters which contribute to the variable nature of winery wastewater. The combinations of the two species under non-obligatory mutualistic growth conditions led to improvement in biomass under model experimental conditions when compared to single species cultures. Additionally, both organisms were able to effectively bio-remediate synthetic and raw winery wastewater as single and co-cultures. We suggest that such engineered mutualisms may be the first step in developing a multispecies approach to winery wastewater treatment while also providing some insight into mutualistic interactions between yeast and microalgae.

## Biography

Zoë Faith Simpson has completed her BSc in Molecular Biology and Biotechnology in 2014. In 2015, she completed another BSc degree in Wine Biotechnology at the Institute for Wine Biotechnology, Stellenbosch University. She is currently a 2nd year MSc student in the Institute for Wine Biotechnology. She is a member of the Golden Key International Honour Society

zfsimpson@sun.ac.za

Notes: