

Technical University of Denmark



## Integrated approaches for assessing cell factories for sustainable bioprocesses

**Workman, Mhairi**

*Published in:*

Book of Abstracts. DTU's Sustain Conference 2015

*Publication date:*

2015

*Document Version*

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Workman, M. (2015). Integrated approaches for assessing cell factories for sustainable bioprocesses. In Book of Abstracts. DTU's Sustain Conference 2015 [B-3] Lyngby: Technical University of Denmark (DTU).

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## **Integrated approaches for assessing cell factories for sustainable bioprocesses**

Mhairi Workman\*

Section for Eukaryotic Biotechnology, DTU Systems Biology

\*Corresponding author email: mwo@dtu.dk

The pursuit of identifying efficient cell factory candidates for production of pharmaceutically relevant products and commodity chemicals, relies heavily on the successful selection of process suitable microorganisms. Hence the selection of efficient cell factories is paramount for successful scale-up to economically viable industrial processes. Accurate quantitative assessment of cellular performance is required for the evaluation of the overall suitability of a micro-organism as an industrial cell factory, ensuring that not only product but also process parameters are optimised.

Significant recent advances in genetic engineering coupled with the demand for novel cell factories, producing a wide range of bioproducts from renewable resources, has led to a dramatic increase in the number of fungal strains generated with potential applications in industrial biology. The revolution in genome sequencing has made rational design and metabolic engineering strategies available, and this has been coupled with a simultaneous advancement of increasingly efficient genetic engineering tools. These developments have been amplified by the advent of new high throughput molecular biology techniques such as USER cloning/fusion and EasyClone and recently, the genome editing system CRISPR/Cas9 has been demonstrated for filamentous fungi. In addition there is a growing demand for cell factories capable of utilizing non-conventional substrates such as glycerol and plant hydrolysates, where both molecular biology techniques and evolutionary engineering is employed in the design process. Consequentially, the bottleneck has shifted from strain construction to characterization, that with the increasing strain numbers makes it imperative to develop and employ high throughput systems for quantitative physiological characterisation.

This presentation will explore how we can integrate the approaches of quantitative physiology, metabolic engineering and systems biology to understand and exploit the full potential of fungal cell factories. Using examples from current research, we will discuss how a progression towards higher throughput, together with improved level of detail in physiological characterisation can pave the way for more rapid implementation of novel cell factories and new bioprocesses.