Turning the petrochemical market green - with RIBOSELECT

A.H. Laustsen[1], H.J. Genee[2], M.M. Mortensen[3], and J.R. Andersen[4]

[1]DTU Chemistry, Technical University of Denmark
[2]DTU Biosustain, Technical University of Denmark
[3]Institute of Plant Biology and Biotechnology, University of Copenhagen
[4] Massachusetts Institute of Technology (MIT) and Aarhus University

A GLOBAL NEED FOR SUSTAINABLE PRODUCTION METHODS

Today most chemicals are manufactured by chemical, oil dependant processes. In the long run, this is neither environmentally nor economically sustainable. With the petrochemical industry being heavily dependent on fossil fuels and/or hazardous chemicals, production of chemicals will meet a future challenge, when oil resources become scarce and demand for sustainability and environmental impact becomes higher. Production of chemicals using enzymes and cell factories has the potential to displace petrochemical synthetic routes, and poses as a highly sustainable solution to these future challenges. Currently, the major limitation for bio-based chemicals is the long and expensive development process required to create efficient and cost-competitive biocatalysts.

RIBOSELECT – UNLOCKING NATURE'S BIOCATALYSTS

We have developed RIBOSELECT, a novel screening technology with ultra high-throughput capacity that accelerates the discovery and development rate of efficient biocatalysts by several orders of magnitude compared to existing technologies. The principle of the technology is positive selection. By a unique genetic system that couples growth of a cell (*E. coli* and yeast) to the presence of a chemical, we have enabled positive selection for chemical producing enzymes that are not normally essential for cell survival. The modular system can be tailored to respond to any compound of interest, and is thus currently being further developed as a platform technology for discovering biocatalysts for multiple compounds. The technology has been developed during Hans Genee's master thesis at the Novo Nordisk Foundation Center for Biosustainability.

The potential of this disruptive technology lies in its application to develop biocatalysts required for cost-competitive, bio-based production at a rate that far exceeds competing technologies. We have performed a preliminary analysis and identified vitamin B1, -B7 and -B12 as target chemicals that are currently produced by hazardous and unsustainable chemical methods, and we are currently working on applying RIBOSELECT in order to enable a bio-based production. Our analysis shows that manufacturers do not only gain a more sustainable production, but may also cut production costs with up to 80% by using our biocatalysts.

In conclusion, we believe that RIBOSELECT offers a solution that will be a major driver in the transformation of the chemical industry towards a green future and contribute importantly to revolutionizing, bio-based, chemical production.

REFERENCES

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