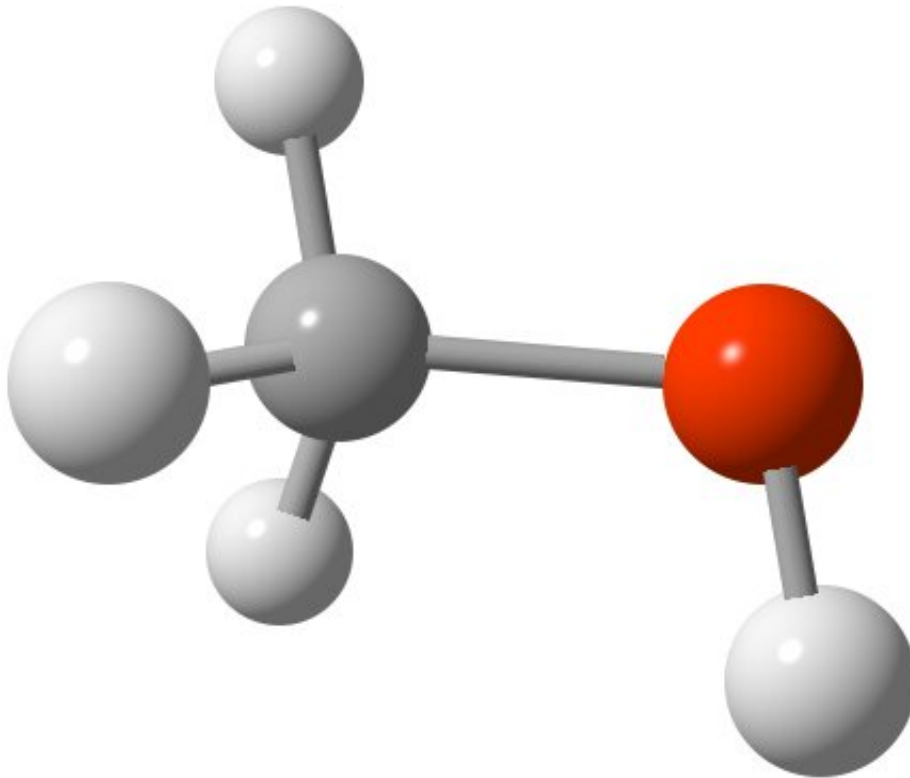


Methanol biotransformation to efficiently produce fatty alcohols

April 27 2023



Methanol structure. Credit: Roland Mattern/Wikimedia Commons, [CC BY-SA](#)

Methanol is a potential feedstock for biomanufacturing since it's easily obtained in an environmentally friendly manner. But it is still challenging to construct a microbial cell factory for methanol-based bioproduction due to the toxicity of methanol and its complex cellular metabolism.

Recently, a research group led by Prof. Zhou Yongjin from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) has engineered yeast *Ogataea polymorpha* for efficient production of fatty alcohols from sole methanol by coupling peroxisomal metabolism.

The study was published in *Proceedings of the National Academy of Sciences* on March 13.

Fatty alcohols are widely used as [detergents](#), emulsifiers, and emollients in [personal care products](#), such as soaps, shampoos and creams. Microbial production from methanol might provide an efficient and sustainable route for supplying fatty alcohols. However, due to the toxicity of methanol and [formaldehyde](#) (the oxidative intermediate of methanol), the overproduction of fatty alcohols in microbial cell factories is hindered.

In this study, the researchers observed compromised fatty alcohol production when constructing the cytosolic biosynthesis pathway in the methylotrophic yeast *Ogataea polymorpha*. The peroxisomal compartmentalization improved fatty alcohol production by coupling the cellular metabolism and product biosynthesis.

Furthermore, the enhancing supply of precursor and cofactor in peroxisome improved the cellular fitness and enabled high-level production of fatty alcohol (up to 3.6 g/L).

"This work provides a feasible engineering strategy to improve [methanol](#) biotransformation toward sustainable production of fatty alcohols," said Prof. Zhou.

More information: Xiaoxin Zhai et al, Peroxisomal metabolic coupling improves fatty alcohol production from sole methanol in yeast,

Proceedings of the National Academy of Sciences (2023). [DOI: 10.1073/pnas.2220816120](https://doi.org/10.1073/pnas.2220816120)

Provided by Chinese Academy of Sciences

Citation: Methanol biotransformation to efficiently produce fatty alcohols (2023, April 27) retrieved 19 July 2024 from <https://phys.org/news/2023-04-methanol-biotransformation-efficiently-fatty-alcohols.html>

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