

Opportunities for the bio-based production of methyl propionate via 2-butanol

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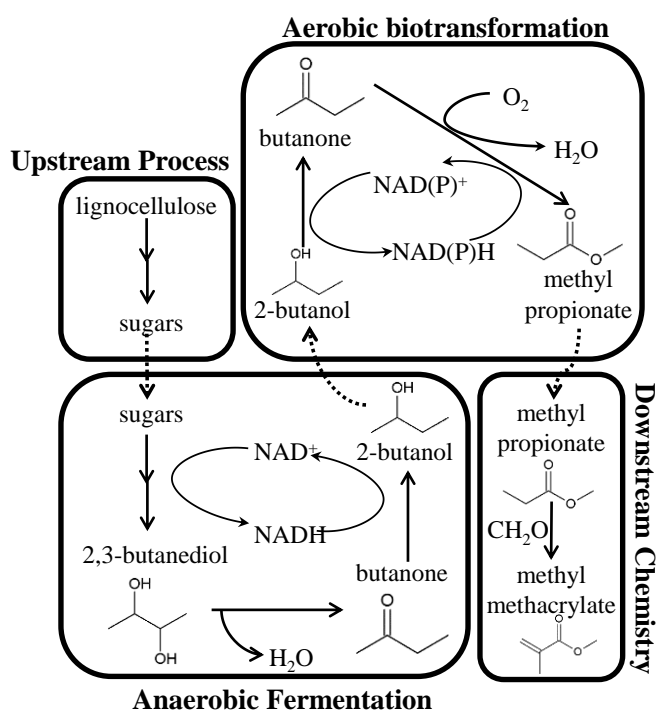


Description

Methyl methacrylate (MMA) is a high-value polymer intermediate, with wide application in several fields. Various petrochemical processes are known for the preparation of MMA, including a route via methyl propionate (MePr), the Alpha technology.

The conventional way to obtain an ester such as MePr from biomass is to esterify a biomass-derived carboxylic acid, but recent findings show that MePr can be obtained from butanone by enzymatic oxidation, via 2-butanol. Thus, the use of renewable carbon sources as substrate for the microbial production of butanone, combined with the enzymatic oxidation of butanone into MePr, would enable the bio-based production of MMA.

Based on this route, this project provides a bio-based alternative for the production of MMA, starting from lignocellulosic biomass. In collaboration with researchers who develop the microbial strains, this project focuses on the overall process design and development.



Dissertation

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Publications from the dissertation

1. Pereira, J.P.C., Verheijen, P.J.T., Straathof, A.J.J. (2016) Growth inhibition of *S. cerevisiae*, *B. subtilis*, and *E. coli* by lignocellulosic and fermentation products. [Appl. Microbiol. Biotechnol. 100, 9069-9080.](#)
 2. Pereira, J.P.C., Lopez-Gomez, G., Reyes, N.G., van der Wielen, L.A.M., Straathof, A.J.J. (2017) Prospects and challenges for the recovery of 2-butanol produced by vacuum fermentation - a techno-economic analysis. [Biotechnol. J. 12, 1600657.](#)
 3. Pereira, J.P.C., van der Wielen, L.A.M., Straathof, A.J.J. (2018) Perspectives for the microbial production of methyl propionate integrated with product recovery. [Bioresour. Technol. 256, 187-194.](#)
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