



Use of extremophilic bacteria for second generation bioethanol production

Tomás, Ana Faria ; Karakashev, Dimitar Borisov; Angelidaki, Irini

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Tomás, A. F., Karakashev, D. B., & Angelidaki, I. (2011). *Use of extremophilic bacteria for second generation bioethanol production*. Abstract from 2011 Symposium The Danish Microbiological Society, Copenhagen, 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.

USE OF EXTREMOPHILIC BACTERIA FOR SECOND GENERATION BIOETHANOL PRODUCTION

Ana F Tomás, Dimitar Karakashev, Irini Angelidaki

DTU Environment, Technical University of Denmark, Miljøvej B.113, 2800 Kongens Lyngby, Denmark

The pursuit of ways to obtain viable alternatives to fossil fuels has been one of the main subjects in microbial biotechnology research in the last decade. Of all the possible fuel candidates, bioethanol is one of the most relevant, especially when considered for the transport sector. Its production from food crops, such as corn (starch) or sugar cane (sucrose) is already an established process, with the USA and Brazil supplying 86% of the market. The major challenge remains in the use of different waste sources – agricultural, forestry, animal and household waste - as a feedstock. The recalcitrance of these materials and their diverse sugar composition make the industrial yeast strains currently used unsuitable for a second generation bioethanol production process.

One of the alternative strategies is the use of extreme thermophilic microorganisms. Currently, selected members from the genera *Clostridium*, *Thermoanaerobacter*, *Geobacillus* and *Thermoanaerobacterium* are among the best candidates. A new strain of *Thermoanaerobacter*, closely related to *T. italicus* and *T. mathranii*, has achieved 0.43 g_{ethanol}/g_{xylose}, which is 83% of the theoretical yield of ethanol based on xylose and the highest value for a wild type strain reported so far. However, productivity and titer values comparable to a first generation process are yet to be achieved. Metabolic engineering to redirect the metabolism from mixed-product fermentation to ethanol production is one of the solutions proposed to improve the performance of extreme thermophilic bacteria.