

Production of Fatty Acids from organic waste

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Description

During extraction of high quality sugars and lipids, a large amount of agricultural residues is produced. This organic matter is currently not used in the biotechnological industry. The main problem is related to the large diversity of organic compounds in these residues. This project aims to develop technology to convert such organic wastes into a valuable resource, one or a few specified compounds. Fermentative processes are the best option because of the variety of potential products (volatile fatty acids e.g. acetate, propionate, butyrate and alcohols such as ethanol), and the fact that most of the organic carbon is conserved in the product (high product yield) (fig 1).

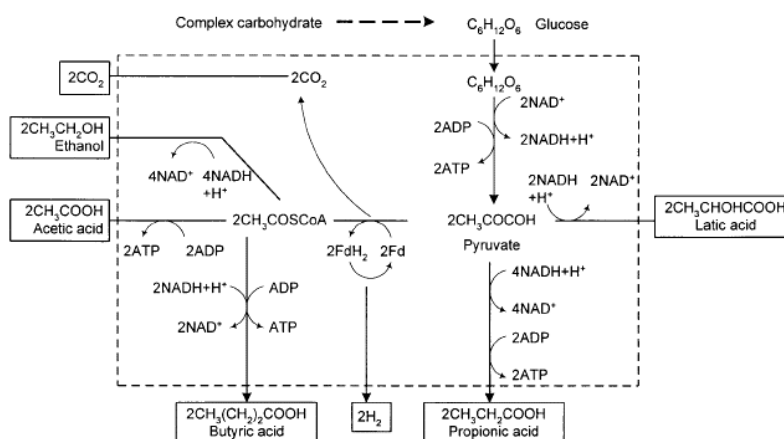


Figure 1-Metabolic pathways possible for the carbohydrate fermentation (Ren *et al.*, 1997)

The use of short chain carbon sources is very suitable for some biological processes such as biopolymers production, biological phosphate removal systems, methanogenesis, etc. The relative type of fermentation product is most likely influenced by the operational conditions (Zoetemeyer *et al.*, 1982). This will allow working under non-sterile conditions with natural microbial populations.

The aim of this project is to develop mixed culture biotechnology based on continuous, but dynamic, process operation under non-sterile conditions, converting many different substrates simultaneously into a defined product. This will be done on a basic understanding and conceptual framework for the fermentation process.

This project has the collaboration of J.M. Lema and J.R. Rodriguez from the Environmental Engineering and Bioprocesses group, University of Santiago de Compostela, Spain (www.usc.es/biogrupo/).

References

Ren N. Wang B & Huang J-C. (1997). Ethanol-type fermentation from carbohydrate in high rate acidogenic reactor. In: *Biotechnol Bioeng* 54(5), p. 428-433

Zoetemeyer RJ, Van den Heuvel JC & Cohen A. (1982). pH influence on acidogenic dissimilation of glucose in an anaerobic digester. In: *Water Res* 16 (3), p. 303-311

Zoetemeyer RJ, Arnoldy P, Cohen A & Boelhouwer C. (1982). Influence of temperature on the anaerobic acidification of glucose in a mixed culture forming part of a two-stage digestion process. In: *Water Res* 16 (3), p. 313-321