Sustainable Production of Bio-based Succinic Acid

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The undeniable request for new synthetic routes for bulk chemicals production, which today, are mostly oil-derived, has arrived together with the urgent need for finding renewable feedstocks. Industrial biotechnology is often regarded as a potentially environmentally friendly alternative technology to replace traditional chemical synthesis of several commodity chemicals from petrochemical based oil refineries, contributing to a more sustainable chemical industry.

During the last decades of the 20th century, biotechnology and biochemical engineering have brought to light sugars as alternative raw-materials to produce a wide range of biobased chemicals aiming for a place of their own in the world chemical market. It is therefore natural that the United States Department of Energy (US DOE) has identified several biobased chemicals as market opportunities for reducing fossil fuel dependency in the chemical industry. These 15 compounds have in common their versatility, as they are often building blocks for other added value chemicals.

Succinic acid, a dicarboxylic acid, has been used as a precursor for many industrially important chemicals as shown in Figure 1. Over the last decade, much progress has been made on the development of a bio-based process for succinic acid production that can ultimately become competitive with the conventional chemical process. And therefore it was identified as one of the top candidates as an alternative to oil-derived bulk chemicals.

The scope of this work is to show how succinic acid can be produced in a cost-effective way from glucose by fed-batch fermentation using recombinant Corynebacterium glutamicum ΔldhA-pCRA717 (Okino, et al. 2008). This project presents and discusses the impact of a wheat flour by-products based route to produce succinic acid. An upstream/downstream process has been designed and optimized for a 10% world market share (18000 ton/year) and the land footprint was determined.

REFERENCES


Biogas produced from biodegradable Waste

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ABSTRACT

Last year as a part of sustainable lab at the Roskilde Festival, our team investigated the potential for producing biogas from discarded food waste at the festival as a sustainable energy source. The subject of the 2011 Roskilde festival was poverty in Africa; the slogan was if it can be done at the Roskilde festival it can be done in Africa. With that in mind our team wanted to prove biogas could be produced under very low tech conditions from food waste, this is a prerequisite for implementing the technology in remote places in Africa where a sustainable heat and electricity is mostly needed.

Our investigation was showed that the festival discards a proximally 13 tons of biodegradable waste each year and the cost of waste management is high both economically and environmentally for the festival, most types of waste could successfully be converted to energy through biogas technology, in Africa the amount of biodegradable waste could provide a sustainable energy source at remote locations.

This year we propose a follow up investigation on a larger scale, we want to figure out what challenges there is both practically and economical in order to implement biogas production as a sustainable alternative to waste. We will do this by implementing biogas production from biodegradable waste at the Roskilde festival in cooperation with DTU Environment and DTU Rise.