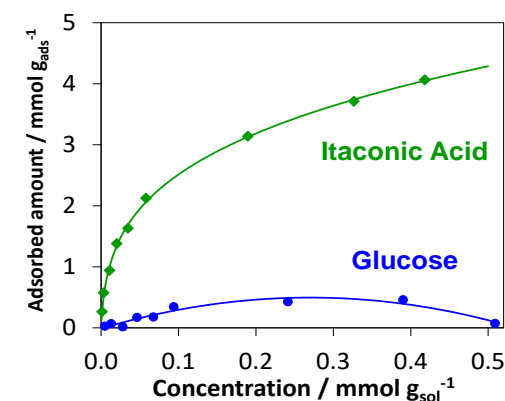


Separation of Itaconic and other Dicarboxylic Acids

New adsorption process for the purification of dicarboxylic acids

Invention

The annual production of dicarboxylic acids such as itaconic acid, a promising platform chemical derived from biomass, is about 80,000 t. A significant growth is expected in 2020 to a market volume of about more than 400,000 t with an estimated overall price



Exceptionally high selectivities can be obtained for the adsorption of itaconic acid from a mixed aqueous solution with glucose using highly hydrophobic adsorbents.

of \$ 567 million. Currently, the state of the art production of itaconic acid is a biotechnological process using bacterial strains like *Aspergillus terreus* with carbohydrates like glucose or starch as C6-source. The most energy-consuming and therefore most expensive step is the recovery of the pure product from fermentation broth. Process optimization result so far in itaconic acid concentrations of about 86 g/L which is not yet cost-covering in view of poor recovery of the desired product in the range of approximately 30% from typically used resins. The present invention provides a novel procedure for a selective and quantitative purification of itaconic and

similar dicarboxylic acids especially from mixtures thereof from aqueous solutions via adsorption techniques. Several conventional and new adsorbent materials and different conditions (temperature and pH-values) have been tested to identify an optimized purification process for numerous dicarboxylic acids with almost full recovery.

Commercial Opportunities

The described technology enables the separation of dicarboxylic acids (e.g. itaconic, succinic, malic, maleic, fumaric acid) or of fractions thereof from biological and/or chemical processes via adsorption technology. On behalf of RWTH Aachen University, PROvendis offers access to rights for commercial use as well as the opportunity for further co-development.

Current Status

In case of interest we are pleased to inform you about the current patent status.

Relevant Publications

Wilke, D. & Vorlop, K.-D. (2001) Biotechnological production of itaconic acid. *Appl. Microbiol. Biotechnol.* 56: 289-95.

Okabe, M., *et al.* (2009) Biotechnological production of itaconic acid and its biosynthesis in *Aspergillus terreus*. *Appl. Microbiol. Biotechnol.* 84: 597-606.

Klement, T. & Büchs, J. (2013) Itaconic acid – a biotechnological process in change. *Biores. Technol.* 135: 422-31.

Detoni, C., *et al.* (2014) Selective liquid phase adsorption of 5-Hydroxymethylfurfural on nanoporous hyper-cross-linked polymers. *ACS Sustainable Chem. Eng.* 2: 2407-15.

An invention of the University of Aachen.

Competitive Advantages

- Effective purification process of itaconic and related dicarboxylic acids
- Separation from biological or chemical processes
- Almost full recovery
- Adsorption technology possible at different pH-values and / or temperatures

Contact:

Ref. No. 4242 / 4649

Dr. Andreas Wagener

PROvendis GmbH

Schlossstrasse 11-15
45468 Muelheim an der Ruhr
Germany

Phone: +49 (0) 208 94 105 38

Fax: +49 (0) 208 94 105 50

E-Mail: aw@provendis.info

Web: www.provendis.info