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Battelle Number(s):

12402

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Conversion of Lactose (milk sugar) to Polyols

SUMMARY

Lactose, commonly referred to as milk sugar, may be readily obtained from cheese whey, the by-product of cheese production. Conversion to higher value added chemicals is highly desirable.

Thus, the higher value added polyols ethylene glycol, propylene glycol, and glycerol may be obtained in high yield from lactose via a process of hydrolysis, hydrogenation, and hydrocracking.

While lactose to polyols has previously been reported, in this improved process the lactose sugar is not directly hydrogenated to a sugar alcohol, but rather first hydrolyzed to glucose and galactose, followed by hydrogenation to sorbitol and dulcitol, and finally hydrocracked to the polyols.

The hydrogenation step employs a ruthenium catalyst, while the hydrocracking step utilizes a stabilized nickel catalyst.

ADVANTAGES

* Sorbitol and dulcitol are hydrocracked to primarily to the three polyols ethylene glycol, propylene glycol and glycerol in high yield.
* A large number of byproducts, which require expensive separations or disposal, are not produced.
* The use of the ruthenium hydrogenation catalyst will allow lower temperature and higher processing rate in the hydrogenation step, thus lowering capital and operating costs.
* The stabilized nickel hydrocracking catalyst will have a long operating lifetime in the aqueous processing system.

U.S. DEPARTMENT OF ENERGY

Patents & Intellectual Property

» Patent #: 6,900,361

Technology Portfolio(s)

» Renewables

Potential Industry Applications

» Chemicals

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