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Solid Acid Catalyzed Hydrolysis of Cellulosic Materials

Background

Ethanol is the most widely used liquid biofuel in the world, and is typically produced by fermentation of simple sugars. Soluble simple sugars can be derived from hydrolysis of starch or cellulose. Hydrolysis processes currently draw significant interest because large amounts of cellulosic feedstock, such as biomass materials, can be easily and cheaply obtained. Cellulose waste can be recycled through an environmentally friendly process, rather than through the traditional methods of burning and land-filling. The hydrolysis process begins with cellulosic materials, such as switchgrass, wood, recycled paper and grass clippings. When these materials undergo acid hydrolysis, the bonds between the complex sugars are broken to provide simple soluble sugars. These soluble sugars can be fermented to yield ethanol. Two common hydrolysis methods are acid hydrolysis and enzymatic hydrolysis. Since neither of these is optimal at this time, a more efficient and inexpensive method for obtaining fermentable sugars is needed.

Invention

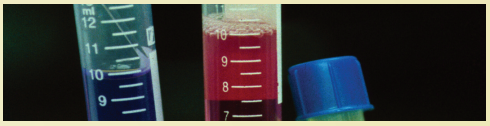
This invention focuses on an improved method of acid hydrolysis. The inventors have shown that when a solid acid material is combined with a cellulose-containing material and agitated, a high yield of soluble sugars can be produced. The agitation of the material provides the kinetic energy necessary to drive the hydrolysis reaction. The solid acid material has a surface acidity that aids in hydrolyzing the glycosydic bonds of the cellulose material. The end result is a cheaper and more efficient method for producing fermentable sugars from biomass.

Application

This invention provides an improved method of acid hydrolysis of cellulosic material leading to the production of ethanol.

Advantages

- Scalable process
- Cost effective
- Environmentally friendly
- High yields



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