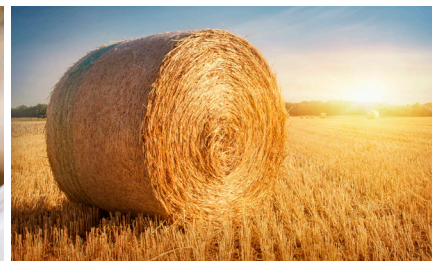
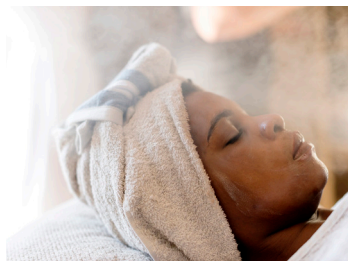
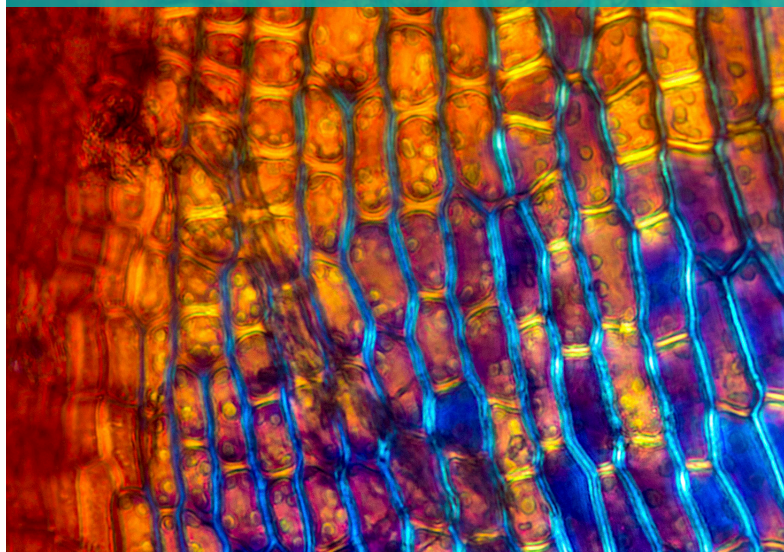


Direct Catalytic Conversion of Cellulose to Glycolic Acid

*Efficient catalytic production of glycolic acid
from raw biomass feedstock*

A novel method to convert directly various cellulose-based biomasses to glycolic acid in water medium and oxygen atmosphere. Glycolic acid is an important compound widely used in organic and polymer synthesis, biodegradable, skin-care products and food processing. The feedstock for this reaction includes, but not limited to, commercially available (α -cellulose) or raw cellulosic biomass (bagasse, hay). The reaction involves the use of metal containing-heteropoly acids (HPM) catalyst that is highly selective leading to a high yield of produced glycolic acid. The developed method allows the recovery of the catalyst in a solid form is possible with consistent high performance in multiple use. This technology provides a new cost-effective eco-benign route for direct biomass conversion to glycolic acid. It offers also the advantage of a purer end-product.

TECHNOLOGY OPPORTUNITY



Benefits

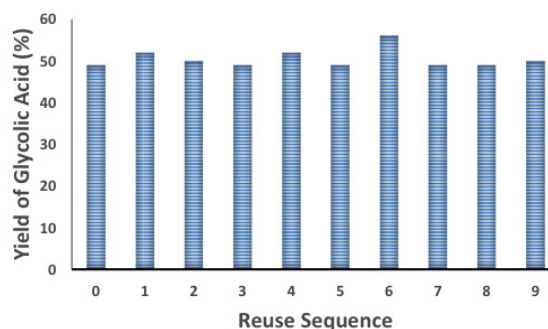
Cost-effective and greener method:

- ▲ No toxic solvents
- ▲ Use of catalyst systems soluble in water
- ▲ Easy recovery and good reusability of the catalyst
- ▲ High production yield
- ▲ Pure end-product

Applications

- ▲ Glycolic acid production
- ▲ Chemicals for personal and industrial use
- ▲ Environmental applications

Technology Details



How It Works

The idea of producing glycolic acid from cellulosic biomass is unique and critical to its application is nature of the catalytic design and process that is not only involved in extracting the cellulose molecules from the biomass but also hydrolyzing the long chain sugars to shorter ones and then oxidizing them to produce glycolic acid is most inventive part of this technology as it is combined in a single step. Hence, use of multifunctional catalysts in this process is what gives this technology its uniqueness.

Why It Is Better

Glycolic acid is a widely used chemical compound and currently it is experiencing rapid growth as a result of that rising demand for its use in consumable products primarily in personal care and household cleaning. Presently, glycolic acid is produced by fermentation and primarily by chemical processes that utilize fossil resources and toxic chemicals. In addition to using nonrenewable resources and harmful compounds, another negative aspect of current methods for making glycolic acid is the presence of impurities that are often associated with the end product.

In this technology, these challenges have been overcome by using this an alternative process for producing glycolic acid as it provides more environmental friendly process, safer, lower in cost and produces purer in end-product. In addition, the discovered process is very easy to scale-up as it uses conventional purification and extraction processes that can be retro-fitted in existing manufacturing settings and designs.

IP Protection

KAUST has an issued patent US, 13/859,887 for this technology.

Opportunity

This technology is part of KAUST's technology commercialization program that seeks to stimulate development and commercial use of KAUST-developed technologies.

Opportunities exist for joint development, patent licensing, or other mutually beneficial relationships.

For More Information

ip@kaust.edu.sa



جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

INNOVATION
AND ECONOMIC
DEVELOPMENT