PROCESS OF PRODUCING ETHANOL AND XYLITOL FROM HYDROLYSATES LIGNOCELLULOSIC THROUGH SEQUENTIAL FERMENTATION

Offering Organization:	Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, A.C.
Type of Organization:	Public Research Center
Development Stage:	Commercial Concept Tests
Desired Relationship:	– Technological research and development financing (technological partner) – Specialized application tests – Creation of a new company (Joint Venture) for the commercialization of the products outlined herein – Licensing of patents
Sector:	Foods
Area of knowledge:	Food Technology
Key words:	Lignocellulosic, ethanol, xylitol, hydrolysates, agro-industrial waste, glucose, xylose

DETAILED DESCRIPTION:

Problem to be solved:

Lignocellulosic material technologies used in the production of metabolites of commercial interest, such as ethanol and xylitol, utilize hydrolysis to break down the cellulose and hemicellulose polymers that are connected to the lignin in their respective monosaccharides. Even though a wide range of agro-industrial wastes exist that can be used as potential sources of sugars in the production of metabolites, one of the main obstacles in obtaining products by fermentation from the hydrolysates that come from such residuals is the presence of fermentation inhibitors such as acetic acid, fruit and phenolic compounds. Thus, most of the work done to obtain ethanol and xylitol from lignocellulosic hydrolysates uses a process of detoxification, which has the disadvantage of making the process more costly.

Solution:

This invention relates to the use of lignocellulosic hydrolysates from any plant source, such as, for example, the following industry residuals: sugarcane, tequila, coffee, production of fruit juice, and the processing of corn or wood. These residuals can be used as sources of glucose and xylose in the production of ethanol and xylitol, so long as microorganisms tolerant to acetic acid, furfural and phenol compounds are utilized.

New and Innovative Aspects:

The use of different lignocellulosic materials provided by different industries and agricultural activities, which can be converted into ethanol and xylitol using a more efficient and cost-effective process that uses toxic-tolerant microorganisms derived from the hydrolysis of these materials.

TECHNICAL CHARACTERISTICS:

This invention refers to a process to produce ethanol and xylitol from lignocellulosic hydrolysates through sequential fermentation:

Step 1. Milling.
Step 2. Washing.
Step 3. Drying.
Step 4. Acid impregnation.
Step 5. Heat pre-treatment.
Step 6. Preparation of enzyme mixture.
Step 7. Enzymatic hydrolysis.
Step 8. Formulation of the first must.
Step 9. First-stage fermentation.
Step 10. Separation of ethanol.
Step 11. Formulation of the second-stage must.
Step 12. Second-stage fermentation.
Step 13. Separation of xylitol.

Main advantages derived from its utilization:

- Lower cost than other biotechnological methods since it does not use detoxification or separation processes of sugars.
- The process of obtaining ethanol and xylitol is more profitable, as it utilizes microorganisms tolerant to toxic compounds.

Applications:

In the following industries: Tequila, coffee, sugarcane, fruit juice production, and processing of corn and wood.

INTELLECTUAL PROPERTY

- Patent granted in 2014, valid until 2027
- MX/a/2007/014257

ABOUT THE OFFERING ORGANIZATION

Presentation:	El Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, A.C. (CIATEJ) is a public research center that belongs to the national technology development and innovation network, the National Council for Science and Technology (CONACyT). CIATEJ is focused on the agricultural, food, health, and environmental sectors with an emphasis on the application of innovative biotechnology.
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