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Ethanol from lignocellulosic residues of palm oil industry.

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Abstract –The search for alternative sources of energy increasing towards the need for independence of the world population to non-renewable resources. This study shows the potential of Lignocellulosic residues in the production of bioethanol. The raw material was crushed palm residues, which has no commercial value and its structure is cellulose, hemicellulose and lignin. Initially the material subjected to a pre-treatment with acid, and subsequently set to be used to generate ethanol. In this work, we used hydrolyzate, obtained after pre-treatment, composed of sugars such as glucose, arabinose and D-xylose, and carried out the fermentation of hydrolyzate, capable of turning these sugars into ethanol.

With the lack of certainty and increasing the price of fossil fuels, the major nations are at the stage of search for new sources of energy, being, renewable. Alternative fuels that have potential to provide reduced rates of emission of gases that contribute to the greenhouse effect, make the investments in research and development in the sector of biofuels increase.

One way to produce biofuels is linked to processes using bagasse, straw, biomass in general. From Lignocellulosic biomass one can produce alcohol through biotechnological processes, creating the second generation of ethanol, also known as bioethanol.

The Lignocellulosic residues are present in all plants (as grass, eucalyptus) and waste from industrial processes (such as bagasse from sugar cane and saw dust). Today, Brazilian ethanol is produced, mainly from the cane. Use other alternatives for ethanol production is the most reasonable path, so the Lignocellulosic biomass has been the subject of many studies.

This study shows the potential of Lignocellulosic materials in production of bioethanol. The raw material was palm bagasse, which has no commercial value and its structure is cellulose, hemicellulose and lignin. Initially the material subjected to a pre-treatment with acid, and subsequently set to be used to generate ethanol. In this work, we used hydrolyzate, obtained after pre-treatment, composed of sugars such as glucose, arabinose and D-xylose, and made the fermentation of hydrolyzate in a Biostat B bioreactor using yeast Pichia stipitis, capable of turning these sugars into ethanol. The approximate initial concentration of D-xylose was 30g / L and at the end of fermentation, when almost all the D-xylose was consumed, was obtained around 7g / L and 11g / L of ethanol using cells propagated in synthetic medium and acclimated, respectively. This study shows that there is a potential use of palm bagasse as raw material for production of ethanol.

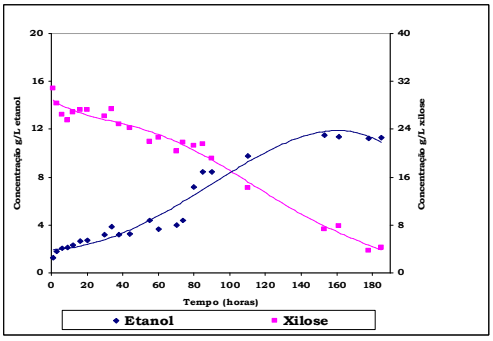

Figure 1: Fermentation without acclimation of cellular

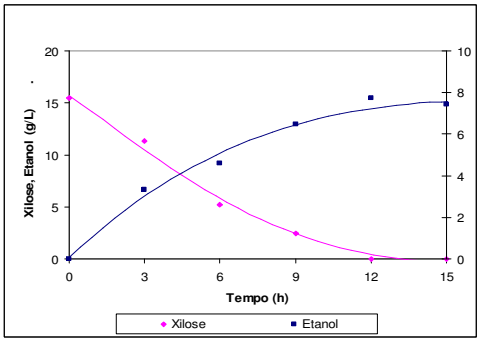

Figure 2: Fermentation with cell acclimation

References

[1] Luis F. Gutiérrez, Oscar J. Sanchez, Carlos A. Cardona, Bioresource Technology, 100 (2009) 1227-1237.