Commentary
Volume 13:11, 2022

Journal of
Biosensors & Bioelectronics

ISSN: 2155-6210 Open Access

Agriculture Wastes are used to Produce Bioethanol

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Description

Currently, around 10% of the world's primary energy requirements are met by biomass. Biomass has a strong chance of replacing the energy supply of an energy-hungry civilization like India due to rising crude oil costs, resource depletion, political instability in producing nations, and environmental issues. India is a major economy that is growing quickly and must seriously address its energy needs to feed its growing population. India needs between two and three times as much energy as it currently produces. It appears that achieving this objective will be extremely difficult at the current rate of production and consumption. As a result, investing in renewable energy options is necessary in nations like India. Bioethanol is currently produced from cereal grains as well as sugar and starch-based raw materials.

Renewable energy is gaining a larger share of global attention due to concerns about the depletion of fossil fuel supplies, the expanding population, and industrialization's ever-increasing fuel consumption. Global governments have supported the use of alternative energy sources in response to the approaching energy crisis. Biofuels like bioethanol, biodiesel, and biohydrogen, to name a few, have gained popularity as the price of oil has risen. Biofuels fall into one of two generations: first or second. Traditional processes are frequently used to produce first-generation biofuels from agricultural waste, lipids, oils, or carbohydrates. Lignocellulosic biomass, which includes cellulosic plant material like stalks, stems, and wood, is frequently used to make biofuels of the second generation. Biohydrogen, biomethanol, and mixed alcohols are among the numerous second-generation biofuels currently under development.

India cannot afford to use cereal grains for the production of ethanol, as is the case in other biofuel-promoting nations like Europe and the United States because the country's population has already surpassed one billion people and poses a threat to food security. Therefore, the accessible sources include plant biomass, a plentiful and renewable supply of energy-rich carbohydrates that microorganisms can easily transform into biofuels, the most common of which is bioethanol, which is currently produced extensively on an industrial scale. It is acknowledged that pretreatment of lignocelluloses is necessary for rapid enzymatic cellulose hydrolysis. Biocomposites and novel sources of vegetable fibers as alternatives to wood raw materials for pulp and paper applications have received a lot of attention in recent years.

The herbaceous, monocotyledonous, annual banana may be an excellent crop for a variety of uses. India is the second largest fruit producer in the world. With a significant socioeconomic impact and accounting for 27% of global banana production, bananas are India's most important fruit crop. It supplied 31% of India's total food production. It is anticipated that 48.9 million tonnes of bananas will be produced worldwide, with 10.4 million tonnes coming from India. India produces the most bananas in the world, followed by China, Brazil, Ecuador, the Philippines, and Ecuador. The majority of the plant residue produced by a hectare of banana cultivation is composed of lignocellulose.

In countries like India, where 4.796 105 of the world's bananas are grown, farmers dump banana trash into rivers, lakes, and roads, causing major problems for the environment. Both a different commercial use and a treatment that is environmentally sustainable are required for this agricultural residue. Leaves and pseudo stems—both of which contain a significant quantity of lignocelluloses—are the primary residuals of banana crops [1,2]. Using a yeast strain of Saccharomyces cerevisiae NCIM 3570 and a bioreactor with a capacity of five liters that was specifically designed for the production of ethanol, we described a method for producing ethanol from lignocellulosics that had been prehydrolyzed by alkali. This was followed by saccharification, which was carried out by co-cultivation of Aspergillus fumigatus and A. elli.

One of the top five countries producing bioethanol is India. Currently, molasses or simple sugars from crops that produce starch or sugar are fermented in alcohol to make bioethanol. In recent years, people have been focusing on forest preservation and developing a practical method for making use of agricultural and forest leftovers [3]. A significant increase in the use of products based on wood fibers is driving this trend, which may result in illegal logging due to decreasing permitted wood supplies. In addition, there are a number of advantages to using cellulose fiber derived from agricultural and forest leftovers, including its recyclability, environmental friendliness, and low cost or even free raw material. Around 4 billion tonnes of lignocellulose fiber from crops were produced annually worldwide, according to statistics. Steel production was only 0.7 billion tonnes per year globally, while plastic production was only 0.1 billion tonnes per year. The enormous potential is demonstrated by these statistics. While bioethanol production from complex lignocellulosic biomass is still in the early stages of research, technologies for producing ethanol from simple carbohydrates are well-known. Bioethanol could be produced at a low cost from agricultural waste. To make ethanol, we used lignocellulosic substrate from the pseudo stem of a banana.

The Malaysia-Indonesian region of South East Asia is home to the Musaceae family of banana plants. In countries that are tropical or subtropical, bananas are a common natural resource. One of the most beneficial plants on the planet is the banana plant. The fruit, peel, leaf, pseudo-stem, stalk, and inflorescence of this plant are all usable components. They are used as a thickener, colorant, and flavoring, macro- and micronutrient supply, livestock feed, fiber, bioactive component source, and organic fertilizer source, among other culinary and nonfood applications [4,5].

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Received: 01 November, 2022, Manuscript No. jbsbe-23-88017; **Editor Assigned:** 04 November, 2022, PreQC No. P-88017; **Reviewed:** 18 November, 2022; QC No. Q-88017; **Revised:** 22 November, 2022; Manuscript No R-88017; **Published:** 30 November, 2022, DOI: 10.37421/2155-6210.2022.13.363

Acknowledgement

None.

Conflict of Interest

None.

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How to cite this article: Timothy, George. "Agriculture Wastes are used to Produce Bioethanol." *J Biosens Bioelectron* 13 (2022): 363.