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Bioethanol from waste potatoes

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In recent decades, producing energy from sustainable resources is considered a better alternative than using fossil fuels which can decrease their availability in nature as well as can be a reason for environmental pollution. Renewable and sustainable liquid fuel can be obtained by producing bioethanol, a type of bioenergy that can help in meeting the universal energy demand. The best way to produce bioethanol is through the fermentation process using different plant products. Plant products that store starch or cellulose can produce bioethanol. Potatoes, which have large production worldwide, are a desirable material for bioethanol production. In 2019, the total world production for potatoes was 376,826,967 metric tons. A great portion of this production is being wasted every year due to poor storage facilities and the conventional peeling method for removing the potato peel that causes the loss of a certain amount of the mash which is rich in starch. These waste potatoes can be used as a promising source of bioethanol. Starchy crops like corn, barley, wheat, rice and tuber crops like potato and sweet potato can also be used for bioethanol production. But using staple crops (like rice, wheat, etc.) for biofuel production may cause cost inflation of these crops leading to food insecurity. Therefore, waste potatoes are a good option for producing bioethanol because of their huge availability, richness in starch and enormous potentiality for industrial production, which includes eco-friendliness, high productivity, low cost, and easy manipulation. The production process includes the treatment of waste potatoes by washing, drying and grounding them in particle size. It is then followed by hydrolysis by soaking in diluted acid, and separation is done resulting in fermentable and non-fermentable parts. The fermentable part is segregated and subjected to fermentation. It is then followed by distillation for the separation of bioethanol. Alternate use of waste potato, like in bioethanol production will convert waste into energy that can help in decreasing environmental pollution and utilise resources in their full length. Commercially, bioethanol can be directly produced from the juices containing free sugar from starchy crops that convert sucrose into glucose through fermentation with microorganisms. The fermentation conditions like time, pH and temperature can be optimised to increase the bioethanol yield. Since the production of bioethanol has numerous benefits, several studies have been performed using agro-industrial wastes for ethanol production and among them, wastes of the potato industry have emerged as an inexpensive feedstock for ethanol production.

Keywords: Bioethanol, Waste potatoes, Biofuel, Fermentation, Starch, Hydrolysis

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