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Tobacco, a platform for efficient biofuel production: Pre-treatment to bioethanol production from lignocellulosic biomass of tobacco**Cotek Temitayo, Kokila S, Mahuya De Ghosh, Prashanthi Karyala and Inla Sravani**
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Statement of the Problem: The escalating industrial and domestic demands on non-renewable energy resources have led to the rapid depletion of fossil fuels. This has resulted in the emergence of bioethanol derived from fermentation of food crops such as maize and corn which has increased the prices of food commodities. Second generation bioethanol based on raw materials rich in complex carbohydrates such as cellulose reduces the competition with the food industry. Tobacco is grown in large fields all over the world and generates multiple harvests per year, thus producing large amounts of inexpensive green biomass. The process to obtain second generation bioethanol involves four basic steps: pretreatment, enzymatic hydrolysis, sugar fermentation and ethanol recovery.

Methodology & Theoretical Orientation: The dried tobacco leaves and stalk were pretreated with water, buffer (0.1 M Citrate buffer) and dilute acids (H_2SO_4 , HCl and HNO_3 at 1%, 4% and 6%) at different temperatures (60°C, autoclave-121°C and 130 °C) and microwave treatment (700 W, 2 min). The percentage of cellulose in the pre and post treated biomass was estimated by the method of Updegraff. The pretreated biomass was subjected to enzymatic hydrolysis using cellulose from *Trichoderma reesei* (~700 U/g of substrate) and β -glucosidase (60 U/g of substrate). The total yield of glucose and ethanol produced for each pretreated biomass was assayed by standard procedures.

Findings: A considerable loss of biomass was observed after pretreatment with dilute acids compared to pretreatment with steam in water or citrate buffer. The highest glucose and ethanol yield was obtained in the pre-treated stalk with steam at 121°C in citrate buffer.

Conclusion & Significance: Results from the presented experimental work indicate that leaves and stalk of tobacco have a vast potential for the production of sugars that eventually can be used for producing bio-ethanol. Despite declining cigarette sales worldwide, the use of tobacco to produce bio-ethanol can be an alternative approach to save tobacco farmers. As tobacco is not a food source it will not drive up food prices.

Biography

Cotek Temitayo has completed his Bachelor's degree in Microbiology, Genetics and Biochemistry. He has done research projects on few topics such as isolation and enumeration of endophytic fungus from medicinal plants, antibiotic resistance of pathogenic bacteria (*Staphylococcus aureus*) and population genetics study on diabetes mellitus.

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