

# National Seminar on Innovative Approaches in Biosciences

*Proceeding*



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**Indian Science Congress Association  
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and

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Principal

Kanoria PG Mahila Mahavidyalaya  
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## PRODUCTION OF BIOFUELS FROM VEGETABLE AND FRUIT WASTE

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### Abstract

Biofuels have been found to efficient alternative to the aggravating pollution problems around the globe. Rapid depletion of fossil fuels due to increasing pollution and exponential growth in industrialization adds to the fast degradation of these resources. The alternative resources like biofuels and biodiesels, bio alcohol (methanol, ethanol and butanol), reused derived fuels chemically stored energy (batteries and fuel cells), vegetable oils, propane and other biomass sources are gaining importance due to their efficiency. Bioethanol is considered as important second generation biofuel and it can be produced from a wide variety of plant material such as algae, jatropha oils, vegetable oils, cellulosic material, corn and sugarcane. Bioethanol chemical composition is same irrespective of source. It is a new fuel source employed in the fuel cell because of its advantage in education of greenhouse effect, low toxicity and lower market cost. The mixture of bioethanol with gasoline or diesel fuel has been used as transport fuel in motor vehicles. The most well-known blends are E85G (85% ethanol, 15% gasoline), E15D (15% ethanol, 85% diesel). Present studies were envisaged considering the importance of ethanol as bio fuels. The enzymatic saccharification of fruit waste i.e. banana, orange, papaya peels were done by *Aspergillus niger* and reduced sugar were estimated by DNS method. The concentration of reduced sugar was 57 percent, 14.8 percent, 16.3 percent for banana, papaya, orange. Further, the fermentation by *Saccharomyces cerevisiae* provides ethanol which was analysed with Potassium dichromate method. The ethanol production was maximum in orange (52.5%) as compared to banana (45.0%) and papaya (39.5%). The perusal of data showed that per gram of glucose produced 10 percent of ethanol which is an encouraging proportion to be used in fuel cells. In future bioethanol is to become more sustainable to replace petrol.

**Keywords:** *Saccharomyces cerevisiae*, *Aspergillus niger*, Decaying fruits, Saccharification, Fermentation, Bioethanol

### Introduction

Today most of the energy demands are met by fossil fuel which is non-renewable, non-friendly but major source of energy (Borah *et al.*, 2011) The present stock of fossil fuel would last only for another 30-40 years at the present consumption rate. It also results in the resources depletion, environmental deterioration and public health problems. Therefore, bio-ethanol has been extensively studied as an alternative to the fossil fuel and its annual, worldwide production is about 51 Billion litres (A.O.A.C, 1970 & 1980).

Biofuel has gained increase interest in recent

years due to environmental and economic reason. The world's largest ethanol producers are Brazil and USA, together they account for 87% of the global ethanol production. In Brazil ethanol is mainly produced from sugarcane and in USA from corn. Therefore, second generation ethanol production has been an interesting alternative because it is made from non-edible sources such as lingo cellulosic material, which comprise mainly cellulose, hemi-cellulose and lignin (Sasaki *et al.*, 1991). The use of ethanol as an alternative motor biofuel has been steadily increasing around the world for a number of reasons. Ethanol, unlike gasoline, is an oxygenated fuel that contains 35% oxygen,