

COMPARATIVE STUDY OF PRODUCTION OF BIOFUEL (ETHANOL) BY CHEMICAL AND FUNGAL METHODS USING VEGETABLES & FRUIT PEELS (37S_B_MSc_010)

**Sponsored by- KARNATAKA STATE BIOFUEL DEVELOPMENT BOARD
(KSBDB) & KARNATAKA STATE COUNCIL FOR SCIENCE AND
TECHNOLOGY (KSCST)**



PROJECT REPORT

SUBMITTED BY

Mr. SAPTARSHI LAHIRI,

Miss. AMRITA BHATTACHARJEE

(Studying Master of Science in Biotechnology, Garden City College)

UNDER THE GUIDANCE OF

Dr. Renukaradhya K. Math

DEPARTMENT OF BIOTECHNOLOGY

Garden City College

Bangalore-560049

JUNE 2014

INTRODUCTION

Bio ethanol is a renewable energy source made by fermenting the sugar and starch components of plant by-products mainly sugarcane and crops like grain, using yeast. It is also made from corn, potatoes, milk, rice, beetroot and recently grapes, banana and dates depending on the countries agricultural strength (Jain and Sharma, 2010; Vazirzadeh, 2013). Humans have been producing ethanol for thousands years. According to the time flow, the area of ethanol has been extending dramatically. The very first time, ethanol existed only in alcoholic drinks. After some purification methods were established, the usage of ethanol highly extended. Then, now, ethanol is at the new step. The current increase in the gas price and interest in environmental problems, ethanol becomes highly attractive again. However, to use ethanol as a substitute of gasoline, there are so many problems on it. We have to establish large industrial ethanol plant (Kohl, 2003, 2004). Also, an increase in the productive efficiency will be required and its effectiveness from stand point of energy balance and environment issues (Esteghlalian et al. 1997).

There are two biochemical production routes for bio-ethanol: (1) First generation technologies utilizing crops rich in starch, e.g. corn, grain and sugar cane, and (2) second generation technologies utilizing lignocellulosic biomass, e.g. wood, agricultural residues and energy crops. Third and Fourth generation bio-fuels include Algal biodiesel, Algal hydrogen and conversion of biomass to hydrogen whereas the fourth generation biofuels include biofuels from high solar efficiency cultivations. However, these are still at a nascent stage. Biofuels offer a number of environmental, social and economic advantages. The use of biofuels may lead to reduction in vehicular pollution and greenhouse gas emissions as it is established that the emission of sulphur dioxide (SO₂), particulate matter and carbon monoxide (CO), etc. are less from biofuels. The economic and social benefits arising out of the development of biofuel sector through increased income and employment opportunities for the rural communities is also highlighted. The greening of wastelands and regeneration of degraded forest lands through cultivation of biofuel crops is another added advantage.

Current scenario of biofuels in India, the domestic production of crude oil from fossil fuels remains more or less stagnant over the year's tonnes of crude petroleum products that cost the country close to \$90 billion in 2008-09. In 2010, India registered the highest change in bio-fuel production from the previous year. With the addition of 0.151 million tonnes of oil equivalent, India registered an 85% increase in production over its 2009 production. India holds only 0.3% share of the global of production in 2010. However, this is likely to increase as India prepares for a change in its bio-fuel mandate from its current E5 (5% ethanol content in the fuel supply) to E10 (10% ethanol content in the fuel supply) and ultimately E20 by 2017. Present estimates indicate India's bio-fuel demand at 0.5 billion gallons in 2012 which will grow to 6.8 billion gallons by 2022. According to India's Planning Commission, the demand for diesel in India is five times higher than petrol. But while the ethanol industry is mature, the biodiesel industry is in its infancy. India's ambitious National Biodiesel Mission will aid in the technological research, production and trade of biodiesel in order to meet 20% of the country's diesel requirements by 2012 and drive production levels upwards for the