Research Journal of Chemical Sciences ISSN 2231-606X
Vol. **9(1),** 19-21, January **(2019)** *Res. J. Chem. Sci.*

Short Review Paper

Review: Ethical consumption of food crops for biofuel production

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Available online at: www.isca.in, www.isca.me
Received 12th November 2018, revised 22nd November 2018, accepted 15th January 2019

Abstract

Biofuel production is an adequate need which will lessen the emission of harmful effluents into the environment. These will provide better environment than fuels derived from fossil fuels. Economic development is also associated with energy sources available in country. So each country wants to have higher reservoirs of fuels than other. In this scenario each country wants to use new technologies which will help them in expanding their energy resources. Biofuels are alternative source of energy where fossil fuel reserves are not used.

Keywords: Food security, raw material, food price hike, food stock, non food crops, ethics, global warming.

Introduction

Biofuels are liquid or gases fuels produced through biomass without using nonrenewable sources of energy like fossil fuels. These are produced from agricultural crops namely food crops but there is an alternative method of production of biofuel from non food crops[1,2]. Biofuels are less costly than fuels derived from non-renewable sources and at the same time these help in environment sustainability. Production of biofuels should not pose threat to food supply especially in developing countries. It should ensure food security. When competition for fuel is there, alternative source of energy is in demand[3]. Biofuels are biodegradable and these can be used without modification in automobiles and engines[4,5].

Production of biofuels from food crops

The raw material from which biofuel is produced should be chosen considerably that it should not be food crop of that area otherwise it will result in food price hike. Biofuels which are produced from soyabean oil[6] cannot be used in diesel motors. Further soyabean is an edible crop and its oil is also used in food. It is a nutritious food crop and ethically it will not serve the purpose of biofuel production. The production of biofuels can increase fuel reservoirs but at the same time it should not be the cause of reduction in food stock.

When bio-fuel is produced from food crops it will results in scarcity of food which will be unethical. Converting food crops into fuel just simply depicts use of technology in negative way. Increase in energy resources whereas on other side there is food shortage, cannot be right approach to scientific behaviour. Biofuels derived from plant sources like sugarcane, maize, palm are food crops for people. There use in production of ethanol had raised food price in US[7]. Crops which cannot be used as food are an alternative choice for biofuel production. Organization should check right to food so that food crops are not used as source of biofuel production[8,9]. If food crops are unfit for consumption to human beings or animals then only it can be used for biofuel production. Non food crops are good substitute in such case.

Global warming threat face by earth is an equal challenge to think about other energy sources which donot emit green house gases. Continuous increase in food prices and production of biofuel from food crops are serious issue regarding distribution of food in regions where it is very difficult for population to at least grab one meal a day. Such scenario will not be ideal for production of biofuel where some of the population is starving and are under malnutrition. Biodiesel produced from food crops such as wheat and maize can be substituted by non-food crops. Likewise bagasse should be used instead of sugarcane for biodiesel production.

Biofuel derived from corn and soyabean was able to satisfy fuel demand of very little population in United States which was not worth the effort as food crops were used still fuel demand was not completed[10]. Farigone[11] stated that biofuel production from single food crop just increased emission of green house gases. Sometimes production of biofuel if carried on large scale result in production of more green house gases. Biofuel derived from palm oil results in decrease in water table as cultivation of palm crop requires more water. This can be substituted with jatropa crop which require less water and can grow on marginal soil. Doornbosch and Steenblik[12] stated that production of biofuels from food crops can cause food and fuel battle where to fill fuel tank upto 50 litres will use 200kg of maize crop which in turn can feed one person for 365 days.

Food security should be an important priority and further water sources should be wisely used. Food and fuel feedstock should be cultivated in proper ratio.

International guidelines for production of biofuels should be properly followed. Rising food prices result in rise in fuel prices and vice-versa. Lack of food can lead to food riots as had happened in Haiti and Mexico. Due to monetary benefits farmers are also considering planting of crops for biofuel production. It is unethical if people fill biofuels in cars produced from food crops and on other side half of population is starving[13].

It is not right decision to use technology for fuel production and to correct pollution issue when half of population is starving. The solution to it is that wisely use crops which are not food crops and utilizing the crops which are unfit for human consumption. Cultivation of crops for biofuel production will also change soil fertility[14]. If using farm land for production of biofuel raises food shortage than it is ethical problem. As feeding car with biofuel is less important than feeding a starving population.

Production of biofuel from non food crops

Production of biofuels from non food crops donot require large farm area and these crops can grow on soils where it donot compete with food crop production. Non food eating crops like jatropha and willow can be used for biodiesel as these donot require special place and care for their production. In Brazil, ethanol is mainly produced by sugarcane. But the same can be produced through bagasse as biofuels produced from waste materials are more acceptable. Due to ethical issues and lack of knowledge of alternatives of production of biofuels from non food crops, it is great challenge to wisely and ethically produce them without harming meal plan of an individual or population of underdeveloped countries. There should be proper communication between scientists and farmers about their crop planning, purpose of production and their monetary benefits as well as with government organizations for food distribution pattern towards under privilege.

Biofuels produced from agricultural crops are not green house gases neutral[15]. Due to monetary benefits biofuels are produced but it should be made sure that food security should be the first concern and during some natural disaster there should be enough food stock to overcome it. Though production of biofuel is helpful in giving employment opportunities to farmers in rural area and to those who have less land as non food crops will be grown easily as they need minimal soil and maintenance. In rich countries where there is less monetary benefits for agriculture crops there farmers are more interested in biomass production. There should be good ratio of biofuel production to food safety to food security and food production[16,17].

If food crop is converted into biofuel when people are dying from mal nutrition and starvation, it is crime against humanity and ethically wrong for scientist and farmer community. US, Brazil and European countries are encouraging biofuel production even from food crops as fuels from nonrenewable resources are producing green houses gases as effluents. Such develop countries to overcome their oil insecurity are converting food crops into fuels but this can lead to food insecurity.
Many corn and grain crops are used for biofuel production this can lead to change in food habits of people, which will further result in instability as if proper food is not available, there will be change in food habits among few which will result in depletion of animals. Food riots in Haiti in 2008 are one of the reasons which happened due to increased in food prices and it resulted in violent clashes due to shortage of food.

Biofuel derived from sugarcane can be substituted with sugarcane bagasse[18].This sugarcane bagasse is abundantly available and is categorized under non-food crop so it will be beneficial for production of biodiesel in adequate amount thus will help in lessen fossil fuel consumption and production of green house gases. Biofuels are also produced through microorganisms[19,20], algae, bacteria and fungi are used for extraction of microbial oil which can be used as bio-fuel. The process of extraction of fuel is low cost process for production of biofuel and this process will not compete with production of food crops. It can serve as good reservoir for biodiesel production. Seeds from Jatropa[21] are crushed to extract oil which is processed further as biodiesel. Biodiesel extracted from Jatropha is good way of extracting fuel from non food crop. This will provide an alternative way for fuel production as well as it is non food crop so it will balance the food vs fuel scenario.

Need for biofuel

The emission of green house gases can be decreased by using biofuels. The consumption of fossil fuels leads to release of harmful gases into the atmosphere. These green house gases lead to change in temperature of earth resulting in global warming. Production of biofuels does not pressurize resources from environment as sources from which these are produced are not restrained from being once used cannot be replenished like non renewable sources. Biofuels produce same amount of carbon as stored in the source of plant for its production. The production of biofuels is equally essential as there is scarcity of nonrenewable resources. Fossil fuels are getting depleted by their excessive usage. To safe guard fuel security it is though essential alternative to growing need of population for fuel demand.

Conclusion

By the production of biofuels, dependency on nonrenewable sources will reduce. This will result in less use of fossil fuels for fuel production. This will prevent pollution and global warming. Use of nonfood crops in biodiesel production will also keep proper balance in food fuel ratio. Moreover, these are biodegradable and produce less toxic effluents thus are environmental friendly. At the same time technology should be wisely used that it donot compete with or use sources which are essential for survival of mankind. The raw material for biofuel production should be wisely selected.

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