

Observation and Development Shoes: Algal Biomass as a Global Source of Transport Fuels

Abstract

The paper validates the different stages in generation of biofuels and provides clarity on III generation biofuels. The microalgae are focused as an incredible source and a detailed discussion has been carried out from the cultivation, extraction and conversion to the final product microalgae as the potential based biofuel.

Keywords: Biofuel • Microalgae • Generation fuels • Cultivation • Pyrolysis

Introduction

Over the past few decades the world has witnessed the energy thirst and exploitation of fuels by developing countries mainly industrialization consuming fossil fuels, record high gasoline process, scaling the dependency on middle east oil sources, metal particles in atmosphere due to the usage of present day fuels the track of source. But, today in 20th century it is really indeed close to loop with the aid of propitious choices in the direction of biofuels. The endless expectations of the society for a fuel which can be the saviour of present day problems points at limited sources. Within a decade span, developing countries with the large interest towards economy growth have consumed 2/3rd of energy than previous years. International Energy Agency (IEA) has summarized the global energy demand to be faced in near future along with and Organization for economic co-operation and development (OECD). According to late economist Angus Madison, the developing countries would surpass the developed countries by 2030 in economic weight. India and China have all the key sources for the improvement of the poor country involving investment and trading. "South – South links" is important sources for development [1]. Though this has improved the overall world economy, significant decline in reserves is also a known fact. The global oil need is constrained with limited number of sense of urgency and insecurity in energy supply, China is receiving its load from more than 20 countries around the world. This shows globally the hunt for new sources is also a key concern

for the search of novel fuel [2]. The Earth Summit held by UN conference in Rio de Janeiro during 3rd to 14th June in 1992 paved the path for environmental concerns including greenhouse effect and acid rain due to the GHG (Greenhouse gas) emissions. Kyoto protocol, a committee of Europe, Japan and Russia aims at CO₂ reduction levels. Developing countries on the surge to industrialization rely on the large quantity of coal and other fossils [3].

Generation (G1) biomass derived biofuels

In the debate between biofuels, it is necessary to distinguish the generation technologies as I and II generation. 1st generation biofuels comprises of both liquid and gaseous types of fuel. Biodiesel, vegetable oil, bio-ethers and bio-alcohol are the liquid forms while forms of biofuels. The I generation (G1) biomass are the oil bearing seeds and edible crops namely starch, sugarcane, animal fats, sunflower, rapeseed and palm molecule unique. Triglycerides are three fatty acid units which are linked to an ester molecule and these triglycerides can be their generation biofuels wither can be used without blending or can be improvised by blending [4]. Table 1 lists the utilization of edible (G1) crop oils such as mustard, rice bran, lemon seed, wheat germ, coconut, soybean, rapeseed, sunflower, almond, walnut and pistachio in the biofuel production. Europe, N. Americas. America and Asian countries function biodiesel plants with castor, sunflower, palm, and atrophy oil sources. Corn and According to

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Low State University the expenditure of ethanol producing corn plant is nearly 0.75 US\$ per litre annually which includes installation, feedstock availability, production and transportation cost. Despite of reduction GHG emissions and atmospheric pollution; they interfere with food security and social conflicts [5].

Generation biofuels (G2)

G2 fuels or advanced fuels are an assured alternative to GI fuels because of the source being non-food biomass. Used oil products from restaurants, animal wastes and oil crops likely jojoba, atrophy and sea mango are also available materials as this next generation resource. Types of nonedible converted to biofuels and the process used for production is given in Table 1. The products cater from ethanol derived from cellulose to bio syngas (Bison); a mixture of hydrogen and carbon mono oxides with different technical approaches. The gasification of dried biomass yields the lighter fuelbiohydrogen, fermentation of cellulose & syngas delivers ethanol, butane (C₄H₉OH) & methanol, FT synthesis followed by BtL provides C₅-C₁₈ hydrocarbon fuels [6]. Comparatively, these fuels are in line with EU-RED (EU- Renewable Energy Directive), eco-friendly, clean burning, non-corrosive, does not lead to deforestation and also it is not used as fodder for animals due to its trace level of toxicity. Biodiesel uses re used oils (cooking, tallow and vegetable oils) by Australian Renewable fuels Lim and bioethanol from wheat straws, agricultural residues, woodchips and sugarcane bagasse by Blue Fire Ethanol Fuels, Inc. US, producing five hundred million gallons while the latter outshines with fifteen billion gallons. In addition, the lack of proper choice as temporary. The search for the renewable and clean fuel has paved its path to III generation biofuels [7].

A bloom in biofuel market –Algae–III generation biofuels (G3)

The processing of this microorganism diversifies the scope in industry. The distinctive properties of algae such as : a) CO₂ absorbance for the growth helps in reduction of green-house effect, b) they do not require large area for development compared to other food crops, c) can adjust to brine water and d) also their lipid content is found high. In early 19th century methane production from algae won a big momentum during energy crisis. World's first biodiesel plant using algae on large scale during II world wars food commodities. The official Program “The

aquatic species” was initiated with 25 million \$ by US 18 years ago [8]. In recent years, the objective to be benefited by algae in synthesizing alternate fuel has been of great interest and they can significantly replace the G1 & G2 biomass. The lipids in algae can be converted to biodiesel by a generalized method used for conversion of vegetable oil into biodiesel. Whereas bioethanol and biobutanol are prepared from carbohydrates of algae this would soar in the near future with proper technology practice. Few algae that are of research interest are *Chlamydomonas reinhardtii* (21% lipids, 48% sugars), *Spiralling platensis* (8% lipids, 60% sugars) and *Chlorella sp.* (19% lipids, 56% sugars). Today nearly 10 countries are keen in biofuel production from the algae biomass [9,10].

Conclusion

Biofuel production from algae will become competitive in the medium term if considered in conjunction with the production of higher value co-products such as bio-fertilizers, biopolymers, etc. The limitations of first and second generation biofuel resources demonstrate clearly that they are grossly inadequate to meet global demands for transport fuels in a sustainable manner. Due to the fact that the results of the R&D efforts that are currently being made will have reduced the overall cost of production, dedicated biofuel production from large-scale algae cultivation appears to be more feasible in the long run. Albeit the make back the initial investment oil cost for biofuel creation from green growth (\$52-91) is higher than most settled bioethanol and biodiesel creation from higher plant sources, it shows up more plausible than the on-going European Association bioethanol creation in view of wheat and sugar beet.

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