European Journal of Humanities and Educational Advancements (EJHEA)
Available Online at: https://www.scholarzest.com
Vol. 5 No. 04, April 2024
ISSN: 2660-5589

BIOFUELS AND ALTERNATIVE ENERGY SOURCES- A REVIEW ARTICLE

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Article history:

Received: January 14th 2024
Accepted: March 11th 2024

Abstract:

Due to the expected decline in energy resources, many countries are looking for alternative fuel sources and trying to find solutions to overcome the expected scarcity of fossil fuels. Therefore, biofuels could be an ideal alternative as sustainable energy obtained from living organisms, whether animals or plants. Unlike other natural resources such as oil and nuclear fuel, it is considered one of the most important renewable energy sources. Therefore, many countries have developed certain types of plants specifically for use in the biofuel sector, as they are considered to be an environmentally friendly and sustainable solution by reducing greenhouse gas emissions to improve energy security and the economic benefits of reducing dependence on non-renewable resources.

A review Article Problem: Despite the worldwide popularity of alternative energy sources, biofuels remain one of the most controversial energy sources despite being considered an alternative energy source. Biofuels rely on biological sources such as plants and crops to provide clean energy, but they also raise food prices and threaten global food security.

Purpose of the review article: Despite the advantages of biofuels, which can be produced at low cost and anytime, anywhere around the world, expanding their production poses a threat to rising food prices and potentially to the world's food supply. Protecting security is a dialectic between protecting the environment and food crises.

The method of the article: Biofuels deal with the energy of living organisms, whether plant or animal. It is one of the most important sources of clean energy, unlike other natural resources such as oil, coal, and all types of fossil fuels.

Keywords: Biofuels, Energy Sources, Environmental Sustainability

1-INTRODUCTION

Biofuels as a renewable energy source have attracted great interest in recent years since it became clear that oil will enter a depletion phase in the near future unless a more sustainable alternative found the world is suffering from an energy supply crisis and rising prices of various energy sources[1]. The use of biofuels (biodiesel), clean energy sources, emissions reductions, sustainable development plans, and the implementation of international agreements stipulating international responsibility for environmental protection, all of which are exacerbating the energy crisis and reducing energy production[2]. Countries that do not do so are exacerbating the energy crisis. If biofuels are not produced locally, the cost of meeting our needs will incur significant economic losses. Biofuels are defined as sustainable energy obtained from living organisms, whether animals or plants[3]. Unlike other natural resources such as oil and nuclear fuel, it is considered one of the most important renewable energy sources as a result, many countries have sought to grow specific types of plants specifically for biofuels, such as corn and soybeans in the United States and sugar cane in Brazil and East Asian oil. Biofuels are produced from a variety of plants, algae, and bacteria, algae are one of the most important energy sources for extracting diesel fuel especially after algae kilograms, producing about 250 ml diesel fuel[4]. An alga grows underwater and thus overcoming one of the main problems facing other materials, which is different from other materials used to produce biofuels. It is chemically converted to get diesel fuel [5]. Biodiesel, which can power many engines, grows rapidly, with algae doubling in size in 24 hours.

Furthermore, some types of algae contain more than 50% of their weight in oil, and this percentage is used for fuel production algae ability to absorb the carbon dioxide they need for growth, and they take in and release carbon dioxide at high rates. Instead, oxygen is used to help clean emissions from nuclear power plants and other energy sources that emit carbon dioxide [6]. In addition, biodiesel is biodegradable and non-toxic, its combustion temperature in the presence of air is approximately 160°C, which is higher than the combustion temperature of fossil diesel (66°C), and it produces less carbon dioxide produced of combustion are much less and kind of gases does regular diesel produce. Biofuels are produced from a number of plant crops, algae and bacteria according [7]:

- **First generation crops**, where plant seeds and grains were used to produce biofuels, including corn, wheat, soybeans, sugarcane, rape, barley, and others.

-**The second generation relies on plant waste**, such as wheat stalks, corn, sawdust, hay, etc., from which cellulosic fuels, ethanol, biomethanol, and biohydrogen are obtained.

-**The third generation uses algae to produce biofuel**, as it contains a good percentage of oils, reaching 60 percent of its weight.

- **The fourth generation**: This generation is the latest global trend for producing biofuels, and it depends on making a change in the genome of a microorganism, a bacteria called *Mycoplasma Laboratorium*, so that it becomes capable of producing fuel from carbon dioxide gas, because algae grow in water, they are uniquely suited to other materials used in biofuel production in terms of overcoming competition for land with other cultures, one of the major problems faced by other materials different form of algae is photosynthetic algae, which are not true plants. Algae can store up to 50% of their body weight as fat until it turns into gas and produces ethanol.

The development of biofuels is just another expansion phase human civilization is witnessing a transition from traditional coal-based fuels to oil and from there to renewable energy sources, bringing with it many economic, social, and environmental opportunities and challenges and the problem and humanitarian impact. Biofuel production remains the subject of international tension between supporters of the production process and opponents on moral grounds[8].

By 2050, biofuels could reduce greenhouse gas emissions by around 1.7 billion tons per year, equivalent to more than 80% of current emissions from the transportation sector.[9]. The entire cycle of producing and using this fuel reduces carbon dioxide emissions by approximately 80% and sulfur dioxide emissions by nearly 100%. It also emits much lower rates of carbon monoxide, a toxic gas, than those produced from waste oil, and the cancer risk reduction rate for other fuels can be as high as 90% [10].

Biodiesel contains 11% oxygen and no sulfur. Containing a higher percentage of lubricant than gasoline, its use can extend the life of your diesel engine, is considered safe to handle and transport because its biodegradation is similar to sugar and its toxicity is thought to be 10 times lower than table salt, this technology has been experimentally proven, with 30 million kilometers covered by this technology in the United States alone. Its combustion eliminates some types of pollution because it does not produce unpleasant odors like those produced by burning fossil fuels [11].

1-1 Increasing production

In 2010, global biofuel production reached 105 billion liters, an increase of 17 percent compared to 2009. In 2010, global fuel ethanol production reached 86 billion liters. The United States and Brazil were the main producing countries, accounting for 90% of world production. The world's largest producer of biodiesel is the European Union, which accounted for 53% of total biodiesel production in 2010 [12].

Biodiesel is produced approximately 1 billion gallons each year, and bioethanol production is approximately 22 billion gallons per year, but decreasing amounts of bioethanol, in addition to increased production of heavy and medium-duty equipment and increased human demand, are increasing the demand for fossil fuels to find other economical and clean fuels [13]. Early this century, the United States announced a 15-year plan to produce 150 billion liters of ethanol from wheat, certain plants, and wood. Ethanol production is based on corn, which accounts for 45% of global production excluding ethanol. Brazil's sugarcane-derived fuel is considered the cheapest to produce among biofuel producing countries in the world, but this type of fuel is currently subject to government subsidies, special incentives, and commercialization in Brazil[14]. They cannot compete with fossil fuels without the tax incentives that allow them to continue future. In many cases. Brazil comes next, relying on sugarcane for 36 percent of global production, while France, Spain and Germany rely on wheat for ethanol production, when it comes to biodiesel production, the United States and Brazil produce it from soybeans, while European Union countries produce it from rapeseed [15].

1-2 Environmental and ethical constraints

The development of land for energy crops and the conversion of agricultural land producing food crops for human and animal consumption to fields intended for the production of biofuels are contributing to imbalances in the world's agricultural diversity. causing an increase in the uprooting of many forests and reserves of natural resources. in soil erosion rates. and consumes a lot of water. Some studies estimate that it takes 5,000 liters of water to produce one liter of biofuel, and 231 kilograms of corn to produce 13 liters of ethanol, cause high levels of water and air pollution due to the large amounts of

pesticides and agricultural fertilizers required to grow energy crops, and also affect and degrade soil quality. Ethical constraints are the most important constraint to denounce, as agricultural production involves a one-time conversion of human food into machine food, in light of statements made by some non-fuel producing countries in international forums. It is thought that there is. Many countries are suffering from food crises that have reached the point of starvation, other constraints include oil discoveries in different parts of the world, particularly in the Middle East [16]. These play a key role in reshaping current and future energy systems and reorienting policy reviews aimed at accelerating the development or production of biofuels and alternative energies general sources. In addition to stabilizing oil prices, this will make biofuels less expand their production [17].

1-3 Alternative energy sources and future fuel :

Bioenergy releases more harmful substances into the environment than pure fossil energy. For this reason, the European Union requires biofuel producers to prove that at least 35 percent, this only applies if the biofuel is grown on previously cleared rainforest land or depleted wetlands, as the biofuel is produced from rapeseed plants vegetable oil can be made from corn, sugar cane, and canola and used as fuel in modified diesel engines. However, salad oil is dense and can damage some diesel engines. Therefore, the solution is biodiesel, which is chemically different from salad oil. Unlike salad oil, which is produced by farmers themselves, biodiesel is produced from the rapeseed plant itself in high-tech facilities [18].

Gasoline in gasoline cars can be replaced with bioethanol, a production method similar to yeast. First, sugar cane, sugar beets, corn, and grains are fermented and then distilled. In many countries, ethanol is mixed with gasoline [19].

1-4 Algae and wood as raw materials:

Algae naturally produce oil, making them naturally suitable for biofuels but the biggest advantage is that growing moss in giant greenhouses requires only a tenth of the space needed to grow corn or canola, and algae growth is unaffected. Some algae produce so much oil that they are suitable for producing aviation kerosene [20]. Please note that so far biokerosene has only been produced from rapeseed oil or grass . Scientists are now exploring producing ethanol from wood, straw and plant waste, which contain cellulose. However, the dilemma here is that some type of enzyme must be used to break down the lignin structure in wood fibers and convert them into another type of flammable sugar [21].

The engine not only operates on liquid energy materials, but can also be powered directly by gas. Many natural gas filling stations around the world offer this service , since natural gas, unlike gasoline, does not change in price, the natural gas combustion process is cleaner than the diesel combustion process, as it produces almost no soot or carbon gas during combustion, making it very suitable for large cities where the environment is affected by soot [22].

Natural gas doesn't have to be a fossil fuel. It can be produced from any biomass animals and plant residues, manure and waste are broken down in filtration equipment and converted into natural gas. Natural gas is a mixture of low viscosity gas and large amounts of methane even with buried stationary waste, natural gas can often be produced after several decades due to the decomposition effects of bacteria present in the waste [23].

Today's large, modified, and upgraded trucks can burn natural gas. To make natural gas suitable for cars, we first need to produce more valuable biomethane. It is also necessary to remove hydrogen sulfide and carbon dioxide present in natural gas [24]. The components of biomethane are easier to separate than biodiesel or bioethanol. To produce the same amount of energy, a third of the agricultural area would need to produce biomethane compared to liquid biofuels [25].

1-5 Fuel and electricity from gas:

Gases such as hydrogen sulfide, carbon dioxide, and natural gas produce liquid fuels. Since the beginning of the 20th century, a complex process of extracting synthetic liquid fuels from gas mixtures using specific catalysts has been known. However, the energy requirements make this process actually difficult when competing with cheaper gasoline and diesel fuels. Natural gas can be converted to hydrogen through a catalytic process [26]. Hydrogen is produced by saturating carbon dioxide and pure hydrogen using a nickel or ruthenium catalyst in methane. It can be connected to natural gas networks or used as fuel for cars, this process is energy efficient. If wind turbines spin too fast or nuclear power plants produce too much electricity, large amounts of hydrogen can be produced, which in turn can produce natural gas. This hydrogen can also be used directly as fuel. Modern fuel cells use it to generate electricity. This is how, for example, electric cars are charged and their emissions are limited to water. But the most interesting topic is methane hydrate, which is made by mixing methane with iron and preserving it in water [27].

1-6 Fossil fuel boom:

The fossil fuel market has experienced a remarkable resurgence in recent years, thanks to new extraction methods such as hydraulic fracturing [17,28] . Many mining companies have created gas deposits and developed oil that were unknown decades ago. Canada, the United States and Estonia are particularly keen to achieve economic and industrial development in this area. However, environmentalists have criticized hydraulic fracturing. The gas is generated from natural rocks under tremendous pressure from alkalizing chemicals in the soil [29].

1-7 Sources and methods of obtaining fuel according [30].

1-Bioalcohols are obtained from plants by microbial fermentation, converting carbohydrates into ethanol alcohol.

2-Biodiesel (acid ester). Fats (based on vegetable oils and animal fats such as soy) coconut oil.

3- Gaseous biofuel (methane gas) Produced from plant residues and animal waste by microbial fermentation. 4-Solid biofuels are wood or animal waste, which can be directly burned to produce heat energy.

2-CONCLUSION

The production of biofuels impacts the greenhouse effect, as does the continued production of biofuels. This leads to more intensive land use. Currently being cultivated, the rate of change is increasing. Produces a second gas depending on the climate there is more carbon dioxide in the atmosphere released by the combustion of fossil fuels worsening of global warming phenomenon increase demand for bioenergy increases. In particular, the population is increasing rural areas where income is overwhelmingly high low per capita tax rate may lead to demolition giant forest trees and crops agricultural inputs that meet local needs energy destroys most trees forest and culture. and on top of that food security is under threat decrease in suitable land can be used to produce human food.

The consensus on sustainable biofuels is an international initiative calling on governments, the private sector and other stakeholders to take concerted action, collective action and global coordination to ensure sustainable trade in fuels, therefore play a key role in critical energy transitions, climate stabilization and, as a result, rural revitalization worldwide. The sustainable consensus initiative not only provides food, feed, fiber and energy, but also provides opportunities for rural development, energy supply diversification, ecosystem protection, biodiversity and soil carbon conservation.

ACKNOWLEDGMENT: The authors would like to thank Baghdad – Iraq for it support in the present work and many thanx to Middle Technical University. Technical Engineering College_Baghdad to help us to get our data.

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