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Commentary

Reduction of Energy Crisis by the Production of Bio-Fuel from Algae

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DESCRIPTION

One of the most serious issues is the energy crisis, which has made the world dangerous and unpeaceful. The demand is steadily expanding. The available resources are fast depleting and all indications indicate that they will soon be gone. In such circumstances, renewable energy sources must be given more consideration. Fossil fuels are widely utilized around the world, but they are unsustainable because they increase CO_2 levels and collect greenhouse gases, which are harmful to the ecosystem. Renewable and environmentally friendly fuels must be developed in order to keep the environment clean and ensure sustainability. Biofuels are liquid fuels derived from agricultural and forest biomass, as well as a biodegradable component of industrial waste. Bio-diesel is made from vegetable oils, biobutanol, *Jatropha curcas* and algae [1]. The world's largest biodiesel producers are Brazil, the United States and the European Union. The amount of biofuel produced is anticipated to be 35 billion liters.

The role of algae in generation of biofuel

An alga is soon becoming the world's most important source of biofuel. They are thought to be the safest, non-competitive and fastest growing organisms among those that could be utilized to make biodiesel. They have the ability to grow without much care on waste nutrients and are thought to be a superior source of biodiesel production than other sources, which can cause food safety issues because they mostly include food plants. Furthermore, compared to algae, agricultural biodiesel composition is less sustainable and limited in quantity [2]. Algae contain approximately 80% of the energy contained in petroleum. Algal cells have higher lipid content than other sources such as soybeans and palm oils, at 30%. Microalgae contain a lipid concentration of 30%-40% by dry weight and this number rises to 85%. Botryococcus braunii is a microalga with hydrocarbon content of 30%-40% that may be extracted readily [3]. Algae can efficiently remove hazardous components from water, making it useful in the treatment of waste water. Their ability to remediate waste water and provide abundant biodiesel makes them suited for large-scale production.

Growth of micro and macro algae

Both micro and macro algae can be grown on a huge scale in a short amount of time. Micro algae can be grown as energy crops since they are photosynthetic and heterotrophic. They can create a variety of economically important chemicals, such as fats and oils. Because algae biofuel contains no toxic compounds, the environment may be kept clean following combustion [4]. Oil content varies by algae species, with varying compositions. Some species have been recognized as having high fatty acid levels. Similarly, certain algae have higher fatty acid content in their dry bulk. Micro algae may thrive in a variety of environments, even when nutrients are scarce. They should be selected for cultivation. The collection of samples requires caution so that the entire biofuel content may be collected through careful instrument handling. Different environmental elements influence growth, which is not well understood in every place, therefore the process necessitates constant attention. It's also important to understand the algae cultivation unit and if a closed system or an open system is preferable. The batch or continuous process is confirmed based on the conditions and facilities, such as pH, temperature, algal specie and biomass amount [5]. Harvesting methods are determined by the location and weather conditions. The settling pond or sedimentation tank is the most recommended harvesting techniques. Throughout the bio-diesel manufacturing process, density and moisture adjustments are required. Spray drying is the most common method, however drum drying has also been recommended. The mechanical handling disruption approach is thought to be the most beneficial. Other restrictions include the use of solvents like hexane and ethanol in active processes. If additional sources are unavailable, ultrasound and microwave based extraction technologies may be useful.

These systems have some significant advantages, such as cost-effectiveness, larger production, commercial scale growth, minimization of sludge accumulation, low energy demands, suitability for tropical and subtropical countries and removal of Biological Oxygen Demand (BOD), but they also have some significant disadvantages, such as light penetration limitation,

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windy weather disruptions, difficulty in maintenance and a higher risk of destruction.

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