



Algae as the Future Energy

Habiba Easmin

BFSc Student, College of Fisheries, AAU, Raha, India

*Corresponding author. E-mail: habibaeasmin26@gmail.com

Algae are small aquatic organisms found in both freshwater and marine water. They possess photosynthetic pigments such as chlorophyll a and b, contained in a special cell structure known as chromatophores which convert sunlight into energy. The cell wall of some microalgae composed of an outer layer of pectin and inner layer of cellulose, which gives algal biomass three main components, carbohydrates, and protein and lipid/natural oils. Under the right conditions algae can make a lot of oil that can be converted into biofuels like biodiesel, biobutanol, bio gasoline, biogas, methanol, ethanol, green diesel, jet fuel etc. Existing fossil fuels reserves rapidly depleting. The current rates of consumption of oil around the world are 30 barrels of oil per annum. Sourcing the soil possesses security and environmental challenges as oil formation decreases and consumption increases, price will continuously increase. The alternative viable way to source of oil is from industrial scale high yield growth system using algae. Algae could potentially produce up to 60 times oil than land based plants.

Algae cultivation: Algae uses sun, carbon dioxide and nutrients to grow in a control environment. Algae can reproduce frequently by both sexually and asexually by formatting flagellate spores and sometimes non flagellate's spores. The vegetative propagation is achieved through fragmentation. By all these algae can multiply very rapidly in a few hours in each day. Selected algae can produce 50 percent oil and 50 percent biomass which convert to fuel products. This makes algae one of the world's most valuable sustainable renewable fuel resources.

Open pond system: The easiest oldest method for cultivation of algae with high oil content is open pond system. Algae are cultivated in the shallow pond under the condition of identical to their natural environment. In this method ponds are designed in a race way configuration. Race way culture is defined as rising of algae in running water. It is high production system which algae are grown in high stocking density. Race ways are designed to provide a flow through system to enable growth of much denser population of microalgae or algae.

Closed loop system: Closed loop system more efficient and quicker than open pond system. In this method algae or micro algae are produce in transparent plastic bags. And allow them to grow under sunlight.

Photo bioreactors: This method provides the high yields of algal growth and producing more biofuels. This technology has perfected on industrial scale technology to grow algae for fuel. Photo bioreactor technology based on the growing and harvesting of this valuable algae. They use 40 foot shipping containers along with solar source of light to grow algae rapidly and profitably. It is scalable and environmentally sustainable in closed system. This technology has been recognized internationally for low water use. The oil is extracted from breaking down cell structure of algae. This could be done by solvent or sound waves. After the oil is extracted, then it is faster processed at an integrated bio refinery or in the future at a traditional oil refinery of algae.

Another great benefit of algae is they need Carbon dioxide to grow and that's good for the environment since it takes carbon dioxide out of the atmosphere making nearly carbon neutral fuel



source. There may even be opportunities to build algae from next to power plants that use fossil fuels actually using carbon dioxide exhaust to feed algae ponds. There are over 1, 00,000 different strains of algae. Some grow better in different climates. So, scientists are testing different algae under much condition to find the best strains and develop the most efficient farming practice. While commercial production is still ways off, algae holds great promise to become a reliable, home-grown, sustainable fuel source to reduce constant our reliance on environment harming fossil fuels.

