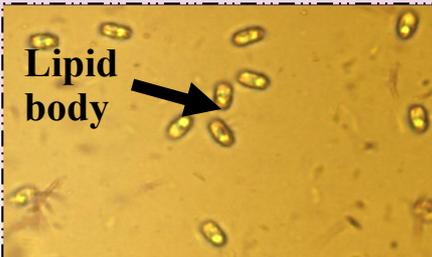
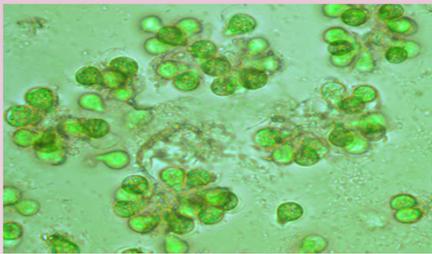
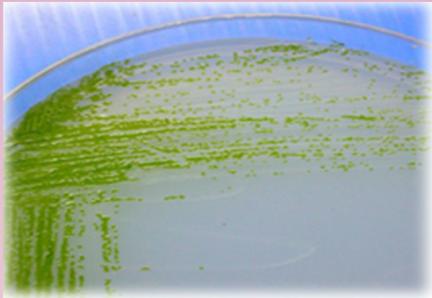
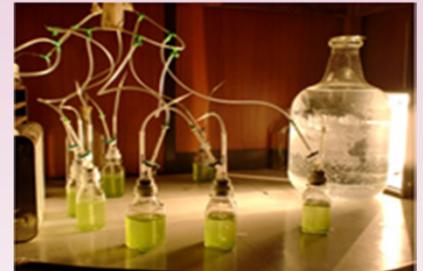
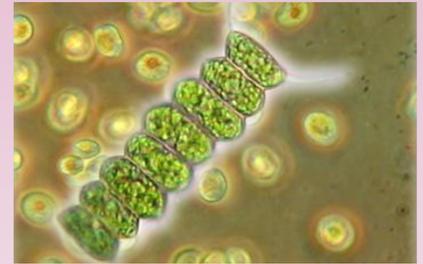


Biodiesel Production from Algae



Algae

Microalgae are sunlight-driven cell factories that convert carbon dioxide to potential biofuels. Since algae can be cultivated using marginal land and saline water, using microalgae to produce biodiesel will not compromise production of food, feed and other products derived from crops. . Microalgae commonly double their biomass within 24 hours, and some can divide within 3.5 hours during their exponential growth. Oil content in some microalgae can exceed 80% by weight of dry biomass. Some microalgae can also grow heterotrophically when a natural organic carbon source such as sugar is supplied in the dark (or mixotrophically when both photosynthesis and respiration are allowed). The advantage of heterotrophic cultivation of algae is the much higher biomass obtained. Depending on species, microalgae produce many different kinds of lipids, hydrocarbons and other complex oils. When algae are nutrient limited, such as nitrogen, they decrease the amounts of essential polyunsaturated fatty acids produced and may yield lower quality protein with fewer amino acids. Nutrient deprivation causes algae to increase lipid production, sometime up to 80%, but unfortunately nutrient deprivation often slows or halts propagation and growth.



Nutritional composition of microalgae

Microalgae have been commercialized because of their biochemical contents that are not only nutritious, but also contain unique bioactive molecules. The high protein content of various microalgal species is one of the main reasons to commercialize the algae as an unconventional source of protein. Algal lipids are composed of triglycerides which can be esterified to methyl esters of fatty acids (12 to 22 carbon atoms). Among all the fatty acids in microalgae, some fatty acids of the ω 3 and ω 6 families are of particular interest as they are parts of important polyunsaturated fatty acids (PUFA).

Algae Cultivation

Many growth conditions, particularly nutritional stress conditions, have been shown to enhance lipid contents of the algae. However, since most of these conditions result in a slower growth rate and decreasing biomass of the algae, such applications may also lead to the lower lipid productivities of the culture. To circumvent this problem, algae may be grown in two stages. The first stage is aimed to maximize biomass, whereas the second stage will be used to increase lipid content of the algae with as minimal adverse growth affect as possible. The ultimate goal is to successfully cultivate the selected algal strains in large-scale outdoor culture. In algae cultivation, high culture density. Algae outdoor was per formed on reducing stressed conditions by shading and inoculum size at start. The results are impressive and /optimized large-scale cultivation is possible.

