

Economic Importance of Algae

Recent estimates show that nearly half the world's productivity that is carbon fixation, comes from the oceans. This is contributed by the algae, the only vegetation in the sea. Algae are vital as primary producers being at the start of most of aquatic food chains.

Algae as Food: Algae are important as a source of food for human beings, domestic animals and fishes. Species of *Porphyra* are eaten in Japan, England and USA. *Ulva*, *Laminaria*, *Sargassum* and *Chlorella* are also used as food in several countries. Sea weeds (*Laminaria*, *Fucus*, *Ascophyllum*) are used as fodder for domestic animals.

Algae in Agriculture: Various blue green algae such as *Oscillatoria*, *Anabaena*, *Nostoc*, *Aulosira* increase the soil fertility by fixing the atmospheric nitrogen. In view of the increasing energy demands and rising costs of chemically making nitrogenous fertilizers, much attention is now being given to nitrogen fixing bacteria and blue green algae. Many species of sea weeds are used as fertilizers in China and Japan.

Algae in Industry

- a. **Agar – agar** : This substance is used as a culture medium while growing bacteria and fungi in the laboratory. It is also used in the preparations of some medicines and cosmetics. It is obtained from the red algae *Gelidium* and *Gracillaria*.
- b. A phycocolloid **Alginic acid** is obtained from brown algae. Algin is used as emulsifier in ice creams, tooth pastes and cosmetics.
- c. **Idodine:** It is obtained from kelps (brown algae) especially from species of *Laminaria*.
- d. **Diatomite** : It is a rock-like deposit formed on the siliceous walls of diatoms(algae of **Chrysophyceae**). When they die they sediment, so that on the seabed and lake bottom extensive deposits can be built up over long periods of time. The resulting '**diatomaceous earth**' has a high proportion of silica. Diatomite is used as a fire proof material and also as an absorbent.

It is used in sound and fire proof rooms. It is also used in packing of corrosive materials and also in the manufacture of dynamite.

Algae in space travel: *Chlorella pyrenoidosa* is used in space travel to get rid of CO_2 and other body wastes. The algae multiplies rapidly and utilizes the CO_2 and liberate O_2 during photosynthesis. It decomposes human urine and faeces to get N_2 for protein synthesis.

Single cell protein (SCP): *Chlorella* and *Spirulina* which are unicellular algae are rich in protein and they are used as protein source. Besides, *Chlorella* is a source of vitamin also. The rich protein and aminoacid content of *chlorella* and *Spirulina* make them ideal for single cell protein production. An antibiotic **Chlorellin** is extracted from *Chlorella*.

Sewage Disposal: Algae like *Chlorella* are grown in large shallow tanks, containing sewage. These algae produce abundant oxygen by rapid photosynthesis. Microorganisms like aerobic bacteria use these oxygen and decompose the organic matter and thus the sewage gets purified.

Harmful effects of Algae

Under certain conditions algae produce '**blooms**', that is dense masses of material. This is especially true in relatively warm conditions when there is high nutrient availability, which sometimes is induced by man as and when sewage is added to water or inorganic fertilizers run off from agricultural land into rivers and lakes. As a result of this a sudden and explosive growth of these primary producers (algae) occurs. They are produced in such a huge quantity that they die before being eaten. The process of decomposition is carried out by aerobic bacteria which in turn multiply rapidly and deplete the water of oxygen. The lack of oxygen leads to the death of fish and other animals and plants in the lakes. The increase of nutrients which starts off the entire process is called **eutrophication** and if rapid it constitutes a major problem of pollution. The toxins produced by algal bloom can also lead to mortality. This can be a serious problem in lakes and oceans. Sometimes the toxins may be stored by shellfish feeding on the algae and be passed on to man causing the disease called paralytic shellfish poisoning. Algae also cause problems in water storage reservoirs where they may taint the water and block the beds of sand used as filters.