Economic importance of Algae

- Algae are simple photosynthetic organisms found mostly in aquatic environments. They have great economic value in many fields like food, industry, agriculture, and medicine, Since from olden days.
- Algae species are intimately connected with human beings as a source food, medicine and other uses. Algae are taking an active role in human beings. Algae are the main Oxygen producers in aquatic areas.
- They are also useful in decreasing water pollution by releasing Oxygen.10% of photosynthesis is occurred by the algae in total photosynthesis quantity.

Algae as a food:

- Algae species are used as food in several countries in several forms. Algae species have proteins, vitamins (A, B, C and E), lipids, and minerals. *Laminaria* species is the important edible seaweed in Japan and the food item 'Kombu' is prepared from it.
- 'Aonori' from Monostroma; 'Asakusa Nori' from *Porphyra* are prepared in different countries. Porphyra has 35% protein, 45% carbohydrates, Vitamins B and C and Niacin. *Nostoc* is used as food material in South America.
- *Gelidium* are widely used in Frozen foods, Dessert gels, Pastry fillings Fruit juices, Syrups, Jams & Jellies, Bakery icings, Sauces and gravies, Relishes, Pimiento strips, Cooked/ instant puddings, Salad dressings.
- Whipped toppings, Milk shakes, Skim milk, Evaporated milk, Chocolate milk, Cheeses, Cottage cheese, Infant formulas, Flans and custards, Yogurt, Instant breakfasts, Ice cream

Algae as fodder for cattle:

- *Rhodymenia palmate* is used as food for sheep in Norway. *Laminaria* also widely used in different regions of the world as a fodder

Algae as fertilizers:

- Blue-green algae are treated as biofertilizers from olden days. *Nostoc, Oscillatoria*, *Scytonema, Spirulina*, etc. are used as fertilizers to rice fields. All these algae are fixed the atmosphere Nitrogen in to ground. Cultivation of *Spirulina* is gaining importance as feed for fish, poultry and cattle.

Algae in Pisi culture:

- Sea algae are used as food for fishes. so they play an important role in Pisi culture. • Some green-algae, Diatoms, some blue-green algae are used as food material to fishes.These are also making the water clean, by realizing Oxygen.

Alginates:

- Alginates are the salts of alginic acid found in the cell wall of Phaeophyceae. Alginates are extracted from *Fucus, Laminaria, Macrocystis* and *Ecklonia.* Alginates are used in the preparation of flameproof fabrics, plastics, paints, gauze material in surgical dressing, soups, ice creams etc.

Algae in reclamation of alkaline or Usar soils:

- Our country has a greater number of alkaline soils or sterile soils. Blue-green algae like *Nostoc, Oscillatoria, Scytonema, Spirulina* are modified the soils in to fertile soils. Because they fixed atmospheric Nitrogen in to soil. Nearly they fixed 400 Kg. of Nitrogen per year. Soil erosion is also reduced by these algae.

Algae in industry:

- Iodine industry is mainly depended upon algae. Algae belonging to Phaeophyceae, like *Laminaria, Ecklonia, Eisenia*, etc. are used in the industry to prepare Iodine in industries.
- *Phyllophora* is used to prepare Iodine in Russia.
- Agar-agar is a jellylike substance of great economic value.
- It is obtained from certain red algae like *Gelidium, Graciliaria*, and *Gigartina.*

Carragheen* or *Carragheenin:

- It is extracted from cell walls of red algae like *Chondrus* and *Gigartina*. It is a polysaccharide esterified with sulphate.
- It is used as emulsifier in pharmaceutical industry and also in textile, leather, cosmetics and brewing industries.

Diatomite:

- Diatoms deposits at marine and fresh water areas. They are rich with silica. It is called as diatomite. It is used in the preparation of Dynamite in olden days.
- But now it is used in different industries like glass, metal polishing, paints, tooth pests, soups, etc.

Minerals:

- The brown sea weeds popularly called as kelp yield potash, soda, and iodine. Some sea weeds are rich source of iron, zinc, copper, manganese and boron. Bromine is extracted from red algae such as *Polysiphonia* and *Rhodymenia.*

Funori:

- It is a type of glue obtained from a red alga *Gloipeltis furcata*. It is used as an adhesive as well as sizing agent for paper and cloth. Chemically it is similar to agar-agar except that there is no sulphate ester group.

Antibiotics and Medicines:

- Antibiotic *Chlorellin*, obtained from Chlorella is effective against a number of pathogenic bacteria. Extracts from Cladophora, *Lyngbya* can kill pathogenic *Pseudomonas* and *Mycobacterium*. *Laminaria* is used as one of the modern tools for abortion.
- Seaweeds have beneficial effect on gall bladders, pancreas, kidneys, uterus and thyroid glands

Role of Algae in Sewage Disposal:

- Some species like *Chlamydomonas, Scenedesmus, Chlorella, Pandorina, Euridina,* etc are living in sewage water.
- They are mainly useful to clean the water by realizing Oxygen.
- They also modified the carbonate material in the water into N, P, K fertilizers.

Algae as research material:

- In biological research algae are useful because of their rapid growth, brief life span and easy mode of cultivation. Chlorella, Scenedesmus and Analysis are used in investigations in photosynthesis. Blue-green algae are used in studies on nitrogen fixation. Researches in Genetics and Cytology are carried out on *Acetabularia.*

Algae in Space:

- *Chlorella* and *Synechococcus* are finding application in space ships and nuclear submarines as oxygen regenerating and food and water recycling organisms.

Harmful aspects of Algae

- Some algae species like Microcystis, Lyngbya are develop water blooms in water areas. • They secrete toxic materials into water. That they polluted the water.

- The algae, *Cephaleuros virescence* causes for red rust tea in tea plant. Some algae species are caused for some skin diseases.

- *Dianophlagellate* is caused for the death of fishes in water. Because of their production of oxygen and their role in the food web, algae are normally beneficial to aquatic life.

- However, a bloom (a large and sudden growth in the population of phytoplankton) can cause the death of many fish. In most cases fish die because the decomposition of large amounts of algae depletes the oxygen in the water.

- Phytoplankton that produce blooms called red tides produce toxins that kill fish directly. These toxins are also poisonous to humans; persons who eat fish contaminated with the toxins can become seriously ill. Most blooms occur in bodies of water that have been polluted with sewage or with runoff containing organic substances such as fertilizers.