17.4E: Edible Algae

Edible algae have been used as food for centuries in many coastal regions all over the world.

Learning Objectives

- Describe the nutritional value of algae

Key Points

- Algae are a very diverse group of generally simple unicellular or multicellular eukaryotic organisms.
- Algae are of excellent nutritional value since they contain complete protein, fiber, and sometimes high levels of omega-3 fatty acids, many vitamins and minerals.
- Some compounds that are used as additives in the food industry are isolated from algae.

Key Terms

- **complete protein**: Complete protein (whole protein) is a protein that contains all of the nine essential amino acids.

Algae are a very diverse group of generally simple unicellular or multicellular eukaryotic organisms. Most of them are autotrophic which means that they can harvest carbon dioxide from the atmosphere and convert it to organic matter. They inherited their photosynthetic apparatus from cyanobacteria. Cyanobacteria are sometimes called blue-green algae but they are prokaryotic organisms and are not true algae. Some cyanobacterial species are used as food as well.

Seaweeds are edible algae that have been used for centuries as food in many coastal regions all over the world. They
may belong to one of three groups of multicellular algae: red, green or brown. In countries such as China, Japan, Korea and to some extent Iceland, Ireland, Chile and New Zealand algae are part of people’s regular diet. They are usually of marine origin since freshwater algae are often poisonous.

Figure: **Sea grapes**: Sea grapes (Caulerpa lentillifera) is a type of seaweed consumed raw as a salad or snack

Algae are of excellent nutritional value since they contain complete protein (in contrast to plant food harvested on land), fiber, and sometimes high levels of omega-3 fatty acids. In fact, the omega-3 acids in fish comes from the microalgae consumed at the bottom of the food pyramid and gradually passed up to the fish at the top. Algae are also rich in many vitamins, such as A, C, B1, B2, B3 and B6, as well as minerals, such as iodine, calcium, potassium, magnesium and iron. They are consumed both cooked, dried and raw.

Cultivated microalgae and cyanobacteria such as *Spirulina* and *Chlorella* are sold as nutritional supplements. Hydrocolloids such as agar, alginate and carrageenan are isolated from wild and cultivated algae and used as additives in the food industry for their emulsifying and thickening properties. Some of the complex polysaccharides found in algae may be digested by bacteria in the gut since the needed enzymes for digestion are abundantly present in Japanese people but absent in people from North America.