Difference Between Red Algae and Brown Algae

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Key Difference - Red Algae vs Brown Algae

Algae are large polyphyletic, photosynthetic organisms that contain a diverse group of species. They range from unicellular microalgae genera such as *Chlorella* to multicellular forms such as giant kelp and brown algae. They are mostly aquatic and autotrophic in nature. They lack stomata, xylem, and phloem that are found in the land plants. The most complex marine algae are seaweeds. On the other hand, the most complex freshwater form is Charophyta which is a group of green algae. They have chlorophyll as their primary photosynthetic pigment. And they lack sterile covering of cells around their reproductive cells. Red algae are one of the oldest eukaryotic algae. They are multicellular, mostly marine algae which included a notable proportion of seaweeds. Only about 5 % of red algae occur in fresh water. Brown algae are another group of algae which are large multicellular, eukaryotic, marine algae that grow mainly in the cold water of Northern Hemisphere. Many types of seaweed are coming under brown algae. The **key difference** between Red Algae and Brown Algae is that**, in red algae, unicellular forms are present while in brown algae, unicellular forms are completely absent.**

What are Red Algae?

Red algae are defined as eukaryotic, multicellular, marine algae which are categorized under the division Rhodophyta. There are around 6500 to 10000 species of red algae are already found and they include some known seaweeds and 160 species of freshwater forms (5% of fresh water forms). The red color of red algae is due to the pigment phycobiliproteins (phycobilin). And also they contain some other pigments such as phycoerythrin and phycocyanin. Sometimes they reflect blue color too.

Red algae range from unicellular microscopic forms to multicellular large fleshy forms. They are found in all regions of the world. They normally grow attached to hard surfaces. Herbivores such as fish, crustaceans, worms, and gastropods are grazing red algae. Red algae have the most complex sexual life cycle among all algae. The female sex organ is known as ‘carpogonium’ that has a uninucleate region which serves as an egg. Red algae also possess a projection called as ‘tricogyne’. The non-motile male gametes (spermatia) are produced by the male sex organ known ‘spermatangia. Some red algae are important foods such as laver, dulse etc.

Figure 02: Red Algae

"Irish mosh" made up of red algae is used as a gelatin substitute in puddings, toothpaste, and ice creams. The gelatin-like substance that is prepared by the red algae species like *Gracilaria* and *Gellidium*, is an important component of bacterial and fungal culture media.

What are Brown Algae?

The brown algae are defined as large, multicellular, eukaryotic marine algae that are categorized under the division Chromophyta. Brown algae come under the class Phaeophyceae. They may grow up to 50 m in length. They are commonly found in cold waters along the continental coasts. Their species color varies from dark brown to olive green depending on the pigment proportion of brown pigment (fucoxanthin) to green pigment (chlorophyll). Brown algae range from small filamentous epiphytes such as *Ectocarpus* to large giant kelp such as *Laminaria* (100 m in length). Some brown algae are attached to rocky coasts in the temperate zones (eg: *Fucus*, *Ascophyllum*) or they float freely (eg: *Sargassum*). They reproduce by both asexual and sexual reproduction. Both zoospores (motile) and gametes have two unequal flagella.

Figure 02: Brown Algae

Brown algae are major sources of iodine, potash, and algin (colloidal gel).The algin is used as a stabilizer in the ice cream industry. Some species are used as fertilizers and some are consumed as vegetables (*Laminaria*) especially in the East Asian region.

What are the Similarities Between Red Algae and Brown Algae?

- Both are eukaryotic algae.
- Both contain marine algae.
- Both have multicellular species.
- Both can be seen in the coastal area and attached to hard surfaces.

What is the Difference Between Red Algae and Brown Algae?

Red Algea vs Brown Algae	
Red algae are defined as eukaryotic, multicellular, marine algae which are categorized under the division of Rhodophyta.	The brown algae are defined as large, multicellular, eukaryotic marine algae which are categorized under the division of Chromophyta.
Class	
Red algae are categorized under the class of “Rhodophyceae”.	Brown algae are categorized under the class of “Phaeophyceae”.
Photosynthesis Pigments	
Red algae have photosynthetic pigments such as phycobilin, phycoerythrin, and phycocyanin.	Brown algae have photosynthetic pigments such as fucoxanthin, chlorophyll.
Reserved Food Material	
In Red algae, the reserved food material is Floridean starch.	In Brown algae, the reserved food materials are Laminarin or Mannitol.
Cell Wall Composition	
In Red algae, the cell wall contains phycocolloid agar and carrageenan.	In Brown algae, the cell wall contains cellulose and the phycocolloid alginic acid (alginate).
Unicellular Forms	
Unicellular forms are present in the Red algae.	Unicellular forms are completely absent in brown algae.

Summary - Red Algae vs Brown Algae

Algae are the most complex form of eukaryotic organisms. They also have prokaryotic cyanobacteria (blue-green algae). There are unicellular and multicellular forms of algae. Algae live in the marine coastal environment as well as in fresh water. Algae are large polyphyletic, photosynthetic organisms. They have chlorophyll as their primary photosynthetic pigment. They lack stomata, xylem, and phloem that are found in the higher plants. Red algae are eukaryotic, multicellular, marine algae which included some of the seaweeds. Red algae are also found in fresh water. Brown algae are large multicellular, eukaryotic, marine algae types that grow mainly in Northern Hemisphere cold water. This is the difference between red algae and brown algae.

Reference:

1.The Editors of Encyclopædia Britannica. “Red algae.” Encyclopædia Britannica, Encyclopædia Britannica, inc., 3 Oct. 2016. Available here

2.The Editors of Encyclopædia Britannica. “Brown algae.” Encyclopædia Britannica, Encyclopædia Britannica, inc., 31 Jan. 2017. Available here

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