Welcome student in this session we're going to see unit II - algae. Module name is the economic importance of algae with special reference to food. Model number is 32 and myself. Sushma Salgaokar, Assistant Professor in Ganpat Parsekar College of Education, Harmal, Goa.

So the outlines for this module are
Economic importance of algae edible algae
And in this we are going to see algae of food and Algae as feed and fodder.

Learning outcomes are as follows.

Explains the economic importance of algae.
Identifies freshwater and marine algae as food for humans.
Identifies freshwater and marine algae as feed and fodder for animals.

In this we are going to see the economic importance of algae in different fields such as in industry, In agriculture, in medicine, as a source of energy, in research, in sewage disposal, in pollution control and edible algae.

we're going to focus mainly on edible algae.

So let's see algae as food.

Spirulina or ArthroSpira species which belongs to blue green algae, used throughout the world. It is used as a food product in making smoothies.It is used as a diet food.
Nutritional values like protein 60 to 71%. carbohydrate 13 to 16% lipid 6 to 7%. Vitamins like B1,B2,B3,B5,B6, E and K minerals, copper, ions,sodium, magnesium Manganese, potassium, zinc, phosphorus and selenium.

Next is chlorella species green algae. It belongs to green algae used throughout the world.It is used as a food product.Same like Spirulina, it is used as a diet food, then nutritional values like proteins45% , carbohydrate 20% , lipid 20%, vitamin A, B, C, K,minerals10% , fiber 5%.

Next is *ulva Lectuca*, which is also known as sea lettuce. belongs to Green Alga, which is used in countries like Scotland and europe. It is used as a green salad and in soups. Use as stir-fry, dry powder
etc then
nutritional values like proteins, carbohydrate and
lipid, vitamin minerals and dietary fiber are
present,
So Protein 12.9% carbohydrate 64. 2%, lipid 1.20% vitamin A, B12, C, and Niacin with minerals like iron Iodine, magnesium,calcium, and phosphorus. Dietary fiber is 31%.

Next is *Caulerpa lentillifera* (sea grapes) which is a sea grape, it belongs to green algae used in countries like Mecton Island,Cebu in central Philippines and Japan. food products in fresh salad,snacks etc. Nutritional values like protein 12.49%, carbohydrate 59%, mineral Phosphorus magnesium, copper, potassium, Iodine, Manganese, sodium and calcium.

Next is *Sacchrarina latissima (Laminaria sacchrarina)* Which is also known as sugar kelp,belongs to Brown algae. It is used in countries like Japan,Europe, and America. Food products like Royal Kombu are prepared from *Sacchrarina.*It is also used for the preparation of fish and meat. It is used as a vegetable with rise in preparation of Nabe which is a Japanese pot dish and to make soup stock dashi which is made above heating water with a combo, it is used as a dried and shredded or fresh or pickled in vinegar. Nutritional values proteins 6 to 26%, carbohydrate57%, lipid 1.1%, vitamin like A, B1, B2, B6, C and E.minerals like Sodium,potassium, phosphorus, calcium,magnesium and Iodine

Next is *undaria pinnatifodia* or wakami or Sea mustard belongs to Brown algae used in countries like Japan, Korea,China. It is also spread through the ballast water to France, NewZealand and Australia. It is used as a food product in salad- soups. Japanese side dish such as Miso Soup, Sunomono Salad- sunomono is a vinegar

food product. It is also used in instant food such as noodles and soups. Nutritional values protein 23% carbohydrate 51%, lipid, 4.5%. Vitamin ACEK, Neonsing minerals like sodium, potassium, phosphorus calcium magnesium, magnesium, copper,cobalt, iron, nickel and zinc.It has a dietary fiber 16 to 51%.

Next is *Alaria Esculenta*,which is also known as Dabberlocks or Winged kelp belonging to Brown algae. It is used in countries like Ireland, Scotland, France, Norway. Canada, Russia, Japan in Greenland. Food products like protein drink, chips, salads, used in Miso Soup and it has a chicken like flavor which is cooked with rice.Then nutritional values proteins 9 to 20%. Carbohydrate 46 to 51% lipid 1 to 2%. Vitamin A, B, C, K minerals like iron Iodine,magnesium, calcium, zinc,sodium, potassium and phosphorus. It has antioxidants which are fucoxanthin and dietary fiber is 31%.

Next is *PorphyraTenera* or it is also known as a purple level that is red algae
used in Countries likeJapan, China, Korea, UK, USA, Canada, Europe, NZ. Food products like Nori, amanori,Zicai or gim, Zekai or lever or korengo. You can prepare sushi with the help of nori sheets, then nutritional values, proteins 35- 40 %. Carbohydrate 40 to 45%, lipid 0.7-1.3%, vitamins like B&C, minerals-sodium potassium, calcium,magnesium, ion, and Iodine. It has a dietary fiber of 12 to 35%.

Next is *Palmaria palmata/ Rhodymenia palmata* , which is also known as Red Dulse belongs to red algae, used in countries like Ireland, Iceland, Scotland and France. Food product like a salty confection is prepared which is also known as dulse , used as a raw, dried, smoked or fried or sometimes it is used as seasoning in soups or on vegetables. Then nutritional values like proteins 8 to 35%, carbohydrate 46 to 56%, lipid 0.7- 3%. Vitamin A,C,D,E,K minerals like calcium, iron,phosphorus, magnesium, magnesium, potassium, sodium, ion is present. This high iron is important for pregnant women, anemic patients.

Next is *Chondrus crispus* which is also known as Irish Moss belongs to red alga. used in countries like Ireland, Iceland,USA, Europe and Japan. Food product is Gelatinous Carbohydrate is used in Pudding making which is known as blancmange and then Jam jellies ,used as a thickener in soup and Stews, etc Nutritional values like proteins 11 to 21%, carbohydrate 55 to 68%.Lipid 1 to 3%. Vitamin B2, B6, B9 and C minerals, copper ions, sodium iodine, sulphur ,magnesium, zinc, potassium and phosphorus.

So next is algae of feed and fodder.

This is the difference between feed and fodder.
the feed defines it is an act of giving food, specially to The animals that to herbivores was and fodder is any agricultural food stuff, used specifically given to domesticated livestock such as Cattle, Rabbit, sheep horses, chicken, which includes hay, straw, grains and legumes etc.

Now the economic importance of algae as a feed and fodder provides nutritious fodder for cattle, sheep, goat, pig and poultry. Higher quality milk with high butter and fat content. Chicken fed on this produces egg with high iodine and carotene, an omega-3 fatty acid. *Spirulina* is used as a feed additive in Japanese fish farming or aquaculture.Next is a valuable feed supplement or substitute for the conventional proteins such as soya bean meal, fish meal etc. It improves immunity and gut function increases the lipid metabolism and the rate of fertility makes the skin healthier in chicken.It lowers the cholesterol level in blood and subsequently in the egg yolk.

This is the *Ascophyllum* Species, an fucus species which is used in countries Norway,Denmark, France, New Zealand,USA for cattle as fodder.
This is the sargassum species used in China as fodder.
Rhodymenia species which is used in France as a fodder.

This is a laminaria species used in Norway, Denmark, France, New Zealand, USA for cattle as fodder .

It is used in Great Britain, France, Pacific Coast of USA for sheep as a folder and chicken as feed.

References.

Thankyou.