Some conventional uses of algae

Excerpts from Wikipedia

Fertilizer

Algae are used by humans in many ways. They are used as fertilizers, soil conditioners and are a source of livestock feed. Because many species are aquatic and microscopic, they are cultured in clear tanks or ponds and either harvested or used to treat effluents pumped through the ponds. Algaculture on a large scale is an important type of aquaculture in some places.

Energy source

- Algae can be used to make biodiesel (see algaculture), bioethanol and biobutanol and by some estimates can produce vastly superior amounts of vegetable oil, compared to terrestrial crops grown for the same purpose.
- Algae can be grown to produce hydrogen. In 1939 a German researcher named Hans Gaffron, while working at the University of Chicago, observed that the algae he was studying, *Chlamydomonas reinhardtii* (a green-algae), would sometimes switch from the production of oxygen to the production of hydrogen.
- Algae can be grown to produce biomass, which can be burned to produce heat and electricity. [9]

Pollution control

- Algae are used in wastewater treatment facilities, reducing the need for greater amounts of toxic chemicals than are already used.
- Algae can be used to capture fertilizers in runoff from farms. When subsequently harvested, the enriched algae itself can be used as fertilizer.
- Algae Bioreactors are used by some powerplants to reduce CO_2 emissions. The CO_2 can be pumped into a pond, or some kind of tank, on which the algae feed. Alternatively, the bioreactor can be installed directly on top of a smokestack.

Stabilizing substances

Chondrus crispus, (probably confused with *Mastocarpus stellatus*, common name: Irish moss), is also used as "carrageen". The name carrageenan comes from the Irish Gaelic for *Chondrus crispus*. It is an excellent stabiliser in milk products - it reacts with the milk protein caesin, other products include: petfoods, toothpaste, ice-creams and lotions etc.[15][23] Alginates in creams and lotions are absorbable through the skin.

Nutrition

Seaweeds are an important source of food, especially in Asia; They are excellent sources of many vitamins including: A, B1, B2, B6, niacin and C. They are rich in iodine, potassium, iron, magnesium and calcium.

Algae is commercially cultivated as a nutritional supplement. One of the most popular microalgal species is Spirulina *(Arthrospira platensis),* which is a Cyanobacteria (known as blue-green algae), and has been hailed by some as a superfood. Other algal species cultivated for their nutritional value include; Chlorella (a green algae), and Dunaliella (*Dunaliella salina*), which is high in beta-carotene and is used in vitamin C supplements.

In China at least 70 species of algae are eaten as is the Chinese "vegetable" known as *fat choy* (which is actually a cyanobacterium). Roughly 20 species of algae are used in everyday cooking in Japan.

Certain species are edible; the best known, especially in Ireland is *Palmaria palmata* (Linnaeus) O. Kuntze (*Rhodymenia palmata* (Linnaeus) Kuntze, common name: dulse). This is a red alga which is dried and may be bought in the shops in Ireland. It is eaten raw, fresh or dried, or cooked like spinach. Similarly, *Durvillaea Antarctica* is eaten in Chile, common name: cochayuyo.

Porphyra (common name: purple laver), is also collected and used in a variety of ways (e.g. "laver bread" in the British Isles). In Ireland it is collected and made into a jelly by stewing or boiling. Preparation also involves frying with fat or converting to a pinkish jelly by heating the fronds in a saucepan with a little water and beating with a

fork. It is also collected and used by people parts of Asia, specifically China and Japan as nori and along most of the coast from California to British Columbia. The Hawaiians and the Maoris of New Zealand also use it.

One particular use is in "instant" puddings, sauces and creams. *Ulva lactuca* (common name: sea lettuce), is used locally in Scotland where it is added to soups or used in salads. *Alaria esculenta* (common name: badderlocks or dabberlocks), is used either fresh or cooked, in Greenland, Iceland, Scotland and Ireland.

The oil from some algae have high levels of unsaturated fatty acids. Arachidonic acid (a polyunsaturated fatty acid), is very high in *Parietochloris incisa*, (a green alga) where it reaches up to 47% of the triglyceride pool (Bigogno C et al. Phytochemistry 2002, 60, 497).

It is a known fact that fish oil contains the omega-3 fatty acids docosahexaenoic acid, commonly known as DHA and eicosapentaenoic acid, or EPA; but The Martek Biosciences Corporation who discovered the source of DHA to be from algae manufactures DHA from algae, which is where fish get their DHA, explains J. Casey Lippmeier, Martek's senior scientist.

The algae are eaten by smaller marine life such as copepods, "and those are eaten by slightly larger fish," says Lippmeier. The DHA gets passed along the food chain, all the way up to the biggest fish, but the original source is the algae.

You can refer to the following npr.org link for an article on algae and omega-3 fatty acids; http://www.npr.org/templates/story/story.php?storyId=15823852.

Other uses

There are also commercial uses of algae as agar.

The natural pigments produced by algae can be used as an alternative to chemical dyes and coloring agents. Many of the paper products used today are not recyclable because of the chemical inks that they use, paper recyclers have found that inks made from algae are much easier to break down. There is also much interest in the food industry into replacing the coloring agents that are currently used with coloring derived from algal pigments.Algea can be used to make pharmaceuticals. Sewage can be treated with algae as well. Some Cosmetics can come from microalgae as well. In Israel, a species of green algae is grown in water tanks, then exposed to direct sunlight and heat which causes it to become bright red in color. It is then harvested and used as a natural pigment for foods such as Salmon.

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For more info, visit:

- http://en.wikipedia.org/wiki/Algae#Uses_of_algae
- uk.oneworld.net/article/view/154354/1/2258 (Can algae save the world?)