Big in Japan

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PRODUCTS FEATURE DIRECTORY

Lesley Goodfellow takes a look at the growth in consumer interest in seaweeds and finds out about the reasons behind their rise in popularity, their health benefits, and how and where they are cultivated and harvested

The Japanese diet depends on them and environmentalists swear by them — whether they are seen as a culturally-specific staple or as a way to achieve better health, marine foods or sea vegetables are an expanding industry.

Plagued by a poor image in the western hemisphere, seaweeds are usually associated with polluted waters, school nature tables and drizzly days at the seaside. Yet in Japan, sea vegetables are as common to traditional cuisine as garden vegetables, and their popularity continues to increase globally with the growth in awareness of their high nutritional value.

Simon Ranger, md of Seagreens, producers of seaweed products, says: "Sea vegetables are the food of the future. They are probably the cleanest and most purified form of food which remains untampered with and [at less risk] of being touched by GM residues."

Seaweed consumption was first recorded in China prior to 300BC when it was mentioned in a book by Chi Han. But it wasn't until around 1670, when Japan began importing seaweed and seaweed products, that the early cultivation techniques began to emerge.

Nori (red algae) was the first extensively cultivated seaweed in Japan during the 1600s and still remains the most popular today — the Japanese consume almost nine billion sheets of nori each year.

Although sea vegetables haven't yet gained cult status in the UK, these marine foods "are becoming more fashionable, and this is reflected in the growth of sushi bars in the country," according to Peter Bradford, marketing manager of Freshlands retail group. Bradford states that "seaweed's profile is often raised from sporadic media interest" and the current trend in Japanese fashion and design is probably encouraging this culinary concept.

What are they?

Marine sea vegetables or seaweeds are defined as algae from the oceans, and scientists generally classify them by their colour. Although biologists classify sea vegetables as plants, the only important characteristic they share with land plants is their ability to utilize sunlight, carbon dioxide, and water to make food — a process called photosynthesis. In green sea vegetables the catalyst in this chemical reaction is ▶

Glossary of popular edible sea vegetables

Nori — Red algae. The sweetest sea vegetable. There are 30 different species of nori.

Arame — A brown sea vegetable found in deep ocean waters. It has a mild flavour.

Dulse — A purple red local sea vegetable with a spicy flavour.

Kombu — A broad-leaf sea vegetable. Ideal for making soup stocks, it helps bring out the subtle flavours of other ingredients.

Hijiki — Has intensely flavoured black strings and expands to three to four times its size when soaked.

Seagreens' organic wild sea wrack comes from the sea around remote conservation islands 60 miles from Norway's arctic coast and is harvested once every four years

the green pigment chlorophyll, while in the red and brown algae other pigments predominate.

Most of the popular edible sea vegetables such as wakame, arame, kombu, and hijiki are classified as brown sea vegetables, while nori is a red sea vegetable. Scientists believe that the different colour pigments allow sea vegetables to synthesize food at different depths in the ocean, depending on light intensity. However, unlike land plants, sea vegetables have

sea vegetables were eaten regularly, lived longer. Since Kondo's field work, scientists have discovered that sea vegetables reduce blood pressure and serum cholesterol, as well as having antibiotic properties.

It has also been found that sea vegetables help the body eliminate toxins by a process which has been linked to a substance called alginic acid — a polysaccharide that is abundant in brown algae such as kombu, arame, hijiki and wakame. Researchers at McGill University in the US have demonstrated that alginic acid binds with any heavy metals found in the intestines and causes them to be eliminated by making them indigestible.

Studies by Japanese researchers have also shown that diets enriched

Today the cooperatives artificially 'seed' their nets, which in turn release spores which attach themselves onto other nets in tanks. The nets containing the spores are then transported to the growing area where they are attached to bamboo poles which form rafts. The growing area can either be in shallow or deeper waters depending on the plants' natural habitat.

Once grown, the seaweed is harvested at various times of the year depending on the species. The plant is cut and piled into a rectangular shape where it is bound with ropes and floated to shore. It is often transported to a factory where it is washed first in sea water and then in fresh water, before being dried, usually in rotary drum dryers. In Japan the drying process often involves the seaweed

Further studies have shown that some seaweeds may become toxic at the end of their reproductive cycle (Yasumoto, 1993). Researchers also stress that over-harvesting may cause seaweed to begin producing toxins as a method of protection (Paul Meyer, 1992).

Some companies carefully check the quality of their seaweeds. Bradford says "UK companies like Clearspring have stringent monitoring procedures in place — sea water is monitored back at source and periodic tests of water samples are carried out in a London laboratory". Chris Dawson, chairman of Clearspring, adds: "We maintain close relationships with our chosen suppliers so we can actively monitor quality standards."

Weed from the wild

Meanwhile, advocates of wild-harvesting techniques are committed to their trade. According to Ranger: "Wild harvesting is a far superior process and we insist that harvesting and drying takes place in one day. I have witnessed scenes where seaweed is left on the quayside for several weeks and has doubtlessly deteriorated."

Wild cultivation means that harvesting may not occur as regularly as farmed seaweed. Seagreens harvest its organic wild sea wrack once every four years in a conservation area in Norway. "There are only a few ice-free summer months in these years when harvesting can take place. We pick when plants are young, as this is when they are at their most nutritious," says Ranger.

Precision is taken when the plants

no true leaves, stem or roots, so, as far as cooking is concerned, their simple structure is an asset.

The nutritional benefits

The nutritional benefits of sea vegetables are immense, and Drs Seibin and Teruko Araski, authors of *Vegetables from the Sea,* claim that they 'contain more minerals than any other food'.

Sea vegetables are virtually fat-free and rich in essential minerals, vitamins, protein and trace elements — calcium, sodium, magnesium, potassium, iron and iodine are all present in significant amounts. They can be especially useful to people eating a dairy-free, grain-based vegetarian and macrobiotic diet.

These edible plants also contain vitamin A, in the form of beta carotene, vitamins B1, B2 and B6, niacin, vitamin C, pantothenic acid, and folic acid. Vitamin B12, which rarely occurs in land vegetables, has also been found in trace amounts. A study in the *American Journal of Clinical Nutrition* found that sea vegetables contain adequate levels of vitamin B12 for breast-feeding women who have a vegetarian diet.

Historically, oriental medicine has attributed many other healthy qualities to sea vegetables. For centuries practitioners believed they helped maintain healthy endocrine and nervous systems, and recent research has come up with similar results.

However, current interest in the medicinal properties of sea vegetables began in 1927 when Professor Kondo of Tohoku University discovered that Japanese people living in areas where with sea vegetables may inhibit the growth of certain tumours. Tests showed that the more sea vegetables an individual ate, the less likely they were to develop colon or rectal cancer. Sea vegetables were also found to inhibit the development of mammary tumours in women suffering from breast cancer.

"Sea vegetables... are probably the cleanest and most purified form of food"

Seaweed farms

The medicinal properties of marine foods have certainly helped establish the boom in the sea vegetable industry. But despite the oceans providing a vast expanse of natural habitat, demand for sea vegetables in some areas, especially in Japan, has led to the rise of seaweed farms to cater for the growth in consumption.

According to Bradford, seaweed farms are entering a new era as farming techniques from the Far East are employed worldwide. During recent decades, Japanese cooperative associations have utilized seaweed farms to provide staple food for the population and also to optimize the culture of several species of algae.

Early culture techniques consisted of setting bundles of twigs in estuaries on which spores settled and grew, and then the mature plants were harvested. Bamboo twigs replaced tree twigs, then these were replaced by nets which were similarly left in the water to collect spores.

being placed in bamboo frames to dry slowly.

Closer to home, the *Irish Times* recently reported the successful completion of growth trials on the edible brown seaweed *Alaria esculenta* off the west coast of Ireland. This species is native to Ireland but is said to taste like the Asian seaweed wakame. Scientists at the National University of Ireland, Galway, say 'it could be ideal for growing under cultivated conditions' and may be used as food for farmed shellfish as well as for human consumption.

Traditionally, seaweed was used as fodder, fertilizer and in pottery glazing where kelp was burnt to make ash in poverty stricken areas of Western Ireland. Currently 17 Irish companies are active in the seaweed industry.

Farming is a cheaper alternative for producers compared with sourcing wild marine food, yet some believe the quality of produce could be inferior as issues such as water pollution as a result of intensive farming practices are raised.

There have been reports of gastro-intestinal illness from around the world which has been linked to consumption of sea vegetables, particularly around the Pacific Rim. Although the causes of toxicity in seaweed have not been clearly determined, researchers believe environmental changes and increased pollution may promote colonization of toxin-producing bacteria.

are cut — the organic process ensures that the seaweed is cut above the stalk, leaving the roots secured to the rock. This method means the plant is able to continue growing. The sea vegetables are then washed in fresh water and air-dried in specially designed tubes. The product is then ready to be packaged.

The future in the UK

Sales of sea vegetables in the UK are growing at a steady rate. However, according to Dawson, sea vegetables are still a niche market, although company sales are growing at ten per cent per annum. Bradford reports that growth is slow but steady and attributes this rate to sea vegetables being "quirky foods — never dramatically fashionable". He predicts that sales will continue to grow at a steady rate.

Tim Powell, sales director of Community Foods which imports the Sanchi brand of seaweeds from Japan, also confirms the steady growth in sales of sea vegetables, especially in product mixes of seaweed.

Bradford predicts that these secondary products are the next stage, as new lines are developing quickly. For example, Eco-zone, importers of wild-harvested seaweeds from Brittany, has produced a fresh seaweed relish, organic bread with seaweed, and a three-flavour mix alongside traditional fresh seaweed. Seagreens has also developed a seaweed table condiment as well as organic wild wrack supplements. Innovation certainly seems to be the current trend in marketing seaweed in the UK. ●