

Seaweed in the Daily Diet and Nutrition

by Simon Ranger with Dr Craig Rose

Seaweed, or macro-algae as it is known scientifically, includes over 10,000 species of the fastest growing plants on 'earth'.



Often confused with 'blue-green' micro-algae which are fresh water organisms including spirulina and chlorella, seaweed species grow only in the oceans, giving them distinct properties and nutritional values.

And often associated with Asian cuisine, seaweeds have been eaten in the West since at least Neolithic times, due to their remarkable nutritional and health benefits, diversity and abundance.

Seaweed is categorised into three groups according to the predominant colour, and some common names include:

- Brown: Bladder Wrack, Kelp, Kombu, Wakame
- Red: Dulse, Laver, Nori
- Green: Sea lettuce, Enteromorpha

Some of these names are associated exclusively with oriental cuisine, like the ubiquitous sushi wrap of Nori - the Japanese alone consume an annual 10 billion sheets of it. But all of these species are among over 630 which grow around our own Atlantic shores!

Different from land vegetation

There are stark differences between land and ocean vegetables, which rank among the earliest forms of vegetation. Their 'soil' is the moving ocean - a nutritious 'soup', repository of all the earth's nutrients. Wherever the same seaweed species are found suitable as human food, their nutritional profile will be remarkably consistent and virtually identical.

In contrast, the nutrient levels and quality of food grown on the land - including micro-algae - whether plant or livestock, vary widely according to location and growing medium. And foods have much narrower profiles of nutrients, hence the need for a varied daily diet.

Certain species have a broader and more balanced range of nutrients than others and in this article we focus on Seagreens' wild 'wrack' species which we harvest among the remote islands of the Scottish Outer Hebrides.

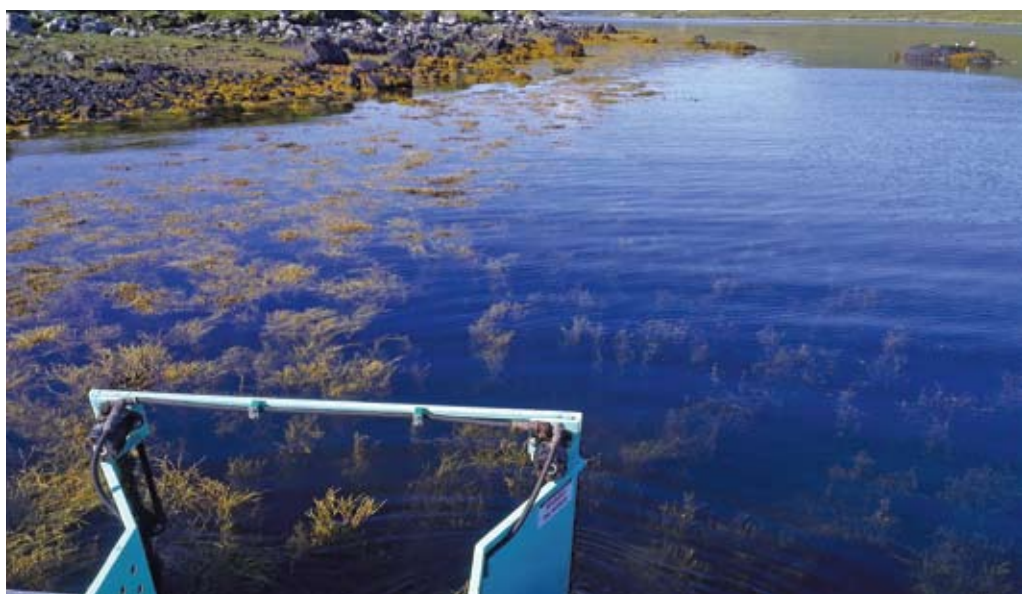
This particular family of the cold water 'brown' seaweeds provide in themselves an outstanding balance of virtually all the nutrients. It includes an unusual range of 'micro' nutrients like all the B vitamins, trace minerals and complex micronutrients as well as all the antioxidants, the same

form of vitamin E as in wheat germ, and a full complement of proteins (1, 2, 3).

Dr Vogel observed in 'The Nature Doctor' that the rain does not return nutrients to the soil and except by flood, volcanic eruption or other catastrophic event, Nature has few means of replenishing the earth (4). The soil's continuous nutrient loss is the ocean's gain. Returning seaweed responsibly to land and food helps complete the natural cycle.

Methods of seaweed selection, harvesting and production can affect nutritional quality in much the same way as different agricultural practices. But however well the soil is husbanded, the seaweed micronutrients may still be deficient in land foods, particularly difficult to obtain in special diets, and wholly absent from processed manufactured foods.

Whereas the best seaweeds grow in the coldest waters, the best land vegetables grow in warmer climes. Seaweeds have survived the most adverse and hostile environments and are consequently rich in protective nutrients and plant growth hormones, beloved of gardeners everywhere. Soaking bean sprout seeds overnight with a sprinkling of Seagreens' horticultural granules in the water is a cheap and adequate demonstration (5).



Human Food Seaweed™

Seagreens has been developing its Human Food Seaweed™ production standards (Patents Pending) for 15 years and you will now find the nutritional profile explained on each of our products.

The most recent analytical study of seaweed products from five countries, independently conducted by the Centre for Food Innovation at Sheffield Hallam University, concluded that Seagreens “meet the current EU Food Guidelines” (2012).

But the best news was contained in the detailed nutritional composition.

Compared to conventional methods of production for the same species, Seagreens’ standards - which cover every aspect of wild plant management, harvesting, handling and processing - were shown to have produced higher levels of the most delicate nutrients including vitamins, phenols and antioxidants. For similar reasons, Seagreens are free of allergens and contaminants.

Seagreens® markers of quality over conventional production

Vitamin C	Over 16 times higher
Tannins	2 times higher
Antioxidants	Over 3.5 times higher
Phenols	Over 3.5 times higher
Silicon	Over 4.5 times lower

Local artisan production should be safe, but the seaweeds you can buy today, even if they meet the (very minimal) Organic Regulations, can be ‘storm-cast’ hauled dead off the beach, dried at temperatures exceeding 100°C or be many years old and nutritionally decomposing. Many used as food and supplement ingredients are industrially harvested for agriculture and their extracts. In very recent years the Food Standards Agency has had to withdraw contaminated seaweed on more than one occasion which should not have entered the human food chain.

Standards and scientific research have been a huge part of what we have achieved and particularly through the Seaweed Health Foundation we are working with other producers and

partners to establish a sustainable and world class seaweed industry in Britain. Seagreens’ founding goal was to get a gram a day of the best seaweed into the daily diet, because it can help address many of our most urgent public health concerns. Such an achievement is no longer a distant goal; in Europe and north America it is within our reach.

The research and its applications

The Wrack species selected for Seagreens® - to date *Ascophyllum*, *Fucus*, and *Pelvetia* - have been the subject of more scientific research than any others. But most of this has focused on plant and animal husbandry and the medical potential of its extracts, for example in tumour research - not as a daily or therapeutic whole food.



Wild species *Ascophyllum*

The Seagreens research is novel, firstly because it has focused exclusively on the use of whole seaweed (dried and cut or milled) in response to various public health concerns and food industry needs. It is also the first seaweed producer in the world to embark on a systematic research strategy to explore a range of related health applications.

Such a strategy is closely related to Seagreens’ work with medical practitioners and organisations and individuals like Planet Organic’s Renée Elliott who directly promote health in the community, as well as the food industry where “implicit improvements in the nutritional profile of foods are essential to have any substantial influence on public health” (6).

The most developed result of this approach to research has been to replace sodium chloride with Seagreens in manufactured foods, combining the potential reduction of heart disease and related conditions in a response to the mandatory reduction of salt in all the industrial nations including China.

An example of the related benefits of the dietary inclusion of Seagreens would be in obesity and weight regulation (7) where the seaweed responds to the concomitant needs, both to directly chelate toxins including heavy metals released from fat reduction, and to support the metabolism of thyroid hormones which can be inhibited as a result.



This 5-year independent research project, begun in 2007 with British government funding at Sheffield Hallam University, was commended by Research Councils UK in 2011 as “research that will have a profound effect on our future” (8).

Already Seagreens ingredients are used extensively in nutritional supplements, smoothies, and a variety of foods providing distinct nutritional advantages not available from terrestrial foods.

For everyday use the flavour profile of the seaweed works well in most foods due to its ‘mineral’ and umami flavours and it has healthy glutamates, rather than the monosodium glutamate widely used in ‘fast’ food.

Seagreens has been independently tested in a variety of foods including breads, pizzas, ready meals, sauces, cheeses and meats and it has extended the shelf-life of breads, sausages and cheeses in terms of the inhibition of mould and bacterial growth.

Seagreens is already in niche and mainstream brands on health store and supermarket shelves throughout the UK. A typical application is a novel, nutritionally balanced pizza developed by Eat Balanced Ltd with Glasgow University which went on sale in UK supermarkets in 2012.

Our research programme currently has around half a dozen studies under way at a similar number of British universities, expanding and exploring different aspects of these areas of health research.

General nutrition

As an ingredient to add to almost any food or therapeutic protocol, Seagreens add significant nutritional value. This is not because of the completeness of the nutrient profile per se but because it permits the nutrients to combine and act upon others and make food or supplements more available.

Quite separately the species are also a source of unusual individual nutrients and nutrient groups. Examples are the special seaweed polysaccharides which are slow digesting sugars with a natural prebiotic, antibacterial and restorative effect in the gut. They are also an ideal source of naturally chelated, stable iodine compliant with the EU Approved Health Claims.

All the important minerals, trace elements, micro-nutrients, vitamin groups, amino acids and essential fatty acids are present, and the species are rich in antioxidants. A few of these might serve as examples.

Prebiotic effect on gut health

A prebiotic is colonised and fermented by beneficial bacteria of the gut microflora, enhancing their growth, the health of the gut and the absorption of nutrients. Foods and food components that make for good prebiotics must be able to pass through the stomach without being broken down by the gastric acidity and enzyme activity.

Research has confirmed the benefits to the gut and bowel of the high fibre and specific polysaccharides in certain seaweeds including their action as effective prebiotics. *Ascophyllum* has more than twice the fibre yet less than 17% the carbohydrate of brown rice (9). In addition, specific seaweed micronutrients, and their bioavailability, are believed to benefit gut health (10).

More recent research, linking to findings in weight management and diabetes, has suggested that obesity and Type 2 diabetes are characterised by gut microbiota (11).

Studies to date on Seagreens *Ascophyllum* species at Teesside University are extremely positive, with examples including improved feed intake in post-weaning pigs, reduced diarrhoea, increased presence of 'good' bacteria (*Lactobacilli*) and reduced presence of 'bad' bacteria (*E.coli*) when diets were supplemented. An unrelated study in

Mineral composition* of seaweed species compared to everyday whole foods

Seaweed species

Mg/100g (dry weight)	Calcium	Potassium	Magnesium	Sodium	Copper	Iron	Iodine	Zinc
Seagreens <i>Ascophyllum</i>	1,350	1,820	826	3,440	0.10	14.20	71.20	4.39
Seagreens <i>Fucus</i>	1,090	1,880	687	2,890	0.15	14.20	52.20	3.52
Seagreens <i>Pelvetia</i>	1,140	2,220	876	4,150	0.15	18.40	24.30	1.87

Everyday foods

Mg/100g (weight)	Calcium	Potassium	Magnesium	Sodium	Copper	Iron	Iodine	Zinc
Brown rice	110	1,160	520	28	1.3	12.9	-	16.2
Whole milk	115	140	11	55	trace	0.1	15.0	0.4
Cheddar cheese	720	77	25	670	0.0	0.3	39.0	2.3
Sirloin steak	9	260	16	49	0.1	1.6	6.0	3.1
Lentils green & brown	71	940	110	12	1.0	11.1	-	3.9
Spinach	170	500	54	140	0.0	2.1	2.0	0.7
Bananas	6	400	34	1	1.1	0.3	8.0	0.2
Brazil nuts	170	660	410	3	1.8	2.5	20.0	4.2
Peanuts	60	670	210	2	1.0	2.5	20.0	3.5

*Seagreens data from independent analysis. Whole foods data from McCance et al, 1993. Partly reproduced from MacArtain et al, 2007

supplemented dairy cows, resulted in increased blood glucose, thought to be due to the improved digestion and utilisation of feed (12).

The results to date show Seagreens promoting the growth of beneficial gut bacteria, whilst concurrent studies at Newcastle University indicate that a high concentration of antioxidants will be released within the gut lumen where the seaweed can deliver cellular protection.

Iodine sufficiency

In the UK, 66% of adult women and 76% of school aged girls are estimated to be iodine deficient. Deficiency is recognised by the World Health Organisation as the world's most prevalent, yet easily preventable cause of brain damage and one of the main causes of impaired cognitive development in children (13).

A comparative study with Glasgow University on the iodine in Seagreens has been submitted for publication in 2013. It is an ideal natural source of iodine contributing to normal thyroid, nervous system and cognitive function, the normal growth of children, normal energy-yielding metabolism, and the maintenance of normal skin. Iodine in the natural environment is found

in a variety of different forms. It is one of the least abundant elements in topsoils and in the body has to compete with halogens like flourine, chlorine and bromine. But sufficient iodine will bind to these potential toxins and remove them.

Whilst some seaweed species contain very high levels of iodine - particularly 'kelp' (the *Laminaria* species) - Seagreens' wild Wracks have safe, adequate levels of absorbable iodine ranging from 240 to 700 micrograms per gram, naturally bound to protein ions which ensures sustained release or excretion as compared to artificial forms of iodine.

Seagreens products Iodine

2 Seagreens Food Capsules (1 gram)	390µg
1/4 teaspoon Food Granules (1 gram)	390µg
1 Seagreens Iodine+ Capsule (500mg)	350µg
Common kelp <i>Laminaria</i> spp. (1 gram)	700-5000µg

A study by Bristol and Surrey Universities in 2012 found 75% of pregnant women were iodine deficient and that babies deprived of iodine are 50% more likely to be among the least intelligent quarter of children by the age of 8 (14).



Wild species Fucus

The so-called Avon study revealed significant deficiencies particularly among school-aged children and a group of academics has called on the UK Government to re-introduce iodine supplementation of table salt. But such an approach is misguided because most salt enters the human diet through manufactured foods, and governments worldwide are trying to reduce salt intake, particularly from manufactured foods. It is impractical because of the vast array of different kinds and brands of salt, and it is contrary to individual freedom.

Many nutrition experts believe the European and US iodine RDIs are too conservative, and higher intakes from seaweed have been shown to provide a protective effect (15). The annual cost of healthcare and lost

work time due to iodine deficiency and thyroid disorders in Germany has been estimated at US\$1 billion (16). World Health Organisation guidelines advise a safe maximum daily intake of 1000µg and the British Health Food Manufacturers Association advises that food supplements should not deliver more than 500µg per day.

Antioxidant capacity

Research on Seagreens at Newcastle University (2012) compared the antioxidant capacity of Seagreens with everyday fruit and vegetables.

The research concluded that the antioxidant capacity of all Seagreens species remained high through simulated enzymatic digestion in the gut, suggesting that Seagreens products:

- will release a high concentration of antioxidants within the gut lumen where they can provide protection against oxidative damage;
- could be more effective radical scavengers than green teas;
- are comparable to other polyphenol-rich food sources.

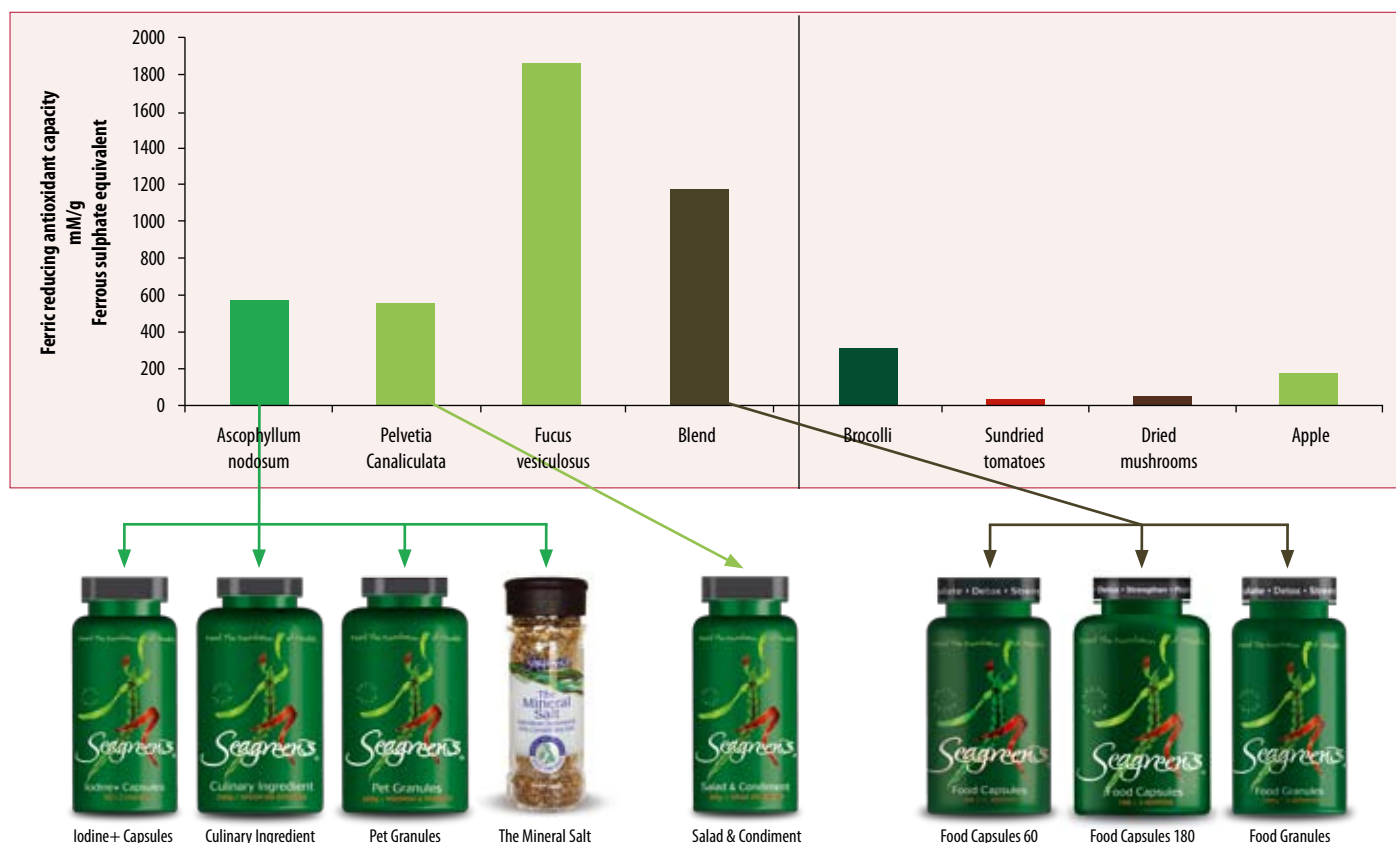
Obesity and weight management

More than 1.4 billion adults and 40 million pre-school children were overweight in 2008, and 500 million adults were obese. At least 2.8 million people each year die as a result of being overweight or obese. The prevalence of obesity nearly doubled between 1980 and 2008. Childhood obesity is one of the most serious public health challenges of the 21st century.

The use of seaweed extracts (alginates) as an aid to weight management has been researched over many years and these extracts are incorporated in many weight loss products. They are typically combined with a catalyst to 'fill' the gut and cause satiety.

In 2009 the first study of its kind using Seagreens Human Food Seaweed™ demonstrated significant reduction in calorie intake in overweight but otherwise healthy males. The whole seaweed (*Ascophyllum nodosum*) was used as a dried, granulated ingredient in a typical everyday breakfast, ensuring the other nutritional benefits are available to the body; something not possible from an extract.

Comparison of the antioxidant capacity of Seagreens at the end of the in vitro enzymatic digestion (i.e. after simulating digestion in the gut) measured by the FRAP assay. Fruit and vegetable data from Nagah and Seal (2005)



Nagah, A.M. and C.J. Seal, In vitro procedure to predict apparent antioxidant release from wholegrain foods measured using three different analytical methods. Journal of the Science of Food and Agriculture, 2005. 85(7): p. 1177-1185.

For example, the results indicated an inhibitory effect on starch enzymes, likely due to specific phenols in the seaweed.

In the study at Sheffield's Centre for Food Innovation, the men consumed on average 179 fewer calories each day (with a reduction of 100 calories being significant in aiding weight loss) after eating bread with Seagreens in it. Importantly there was no effect on the uptake of nutrients (which was found in a study using *Nori*) or on glucose and cholesterol levels.

All Seagreens products are certified allergen free and its latest product received a commendation in the London Free From Food Awards in 2011. The research with Seagreens on managing satiety and the release of sugars to the blood provides strong evidence that the seaweed can benefit diabetics through the inhibition of amylase and slowing the release of sugars to the blood (18). These benefits and a broad dietary foundation tick all the boxes as an ingredient in diabetic, Free From and all special needs food and diets.



Wild species *Pelvetia*

This award-winning study was published in the journal *Appetite* in 2012 (6), and further research continues at Newcastle University. The current studies are application focused, designed to show the effect of Seagreens specifically in foods with a high Glycemic Index.

Diabetes

Linked to obesity, diabetes is another growing health concern with massive societal costs. Globally, 44% of diabetes, 23% of ischaemic heart disease and 7–41% of certain cancers are attributable to overweight and obesity. Around 347 million people worldwide have diabetes, predicted to become the 7th largest cause of death in the world by 2030. Type 2 diabetes - its most common form - can be prevented (17). In the UK, the average presentation of diabetes is 4.6% of the population (www.diabetes.org.uk). Type 2 is certainly treatable with foods including seaweed.

Figures from the USA (2007), where 7.8% of the population (23.6 million) are diabetic, show that the diabetic packaged food market reached US\$282.9 million in 2009, and is forecast to rise to US\$316.5 million by 2014. A similar trend is emerging in the UK.

Natural food nutrients

Seaweed offers such a natural abundance of nutrients it is worth considering their special usefulness to the body. For example, where synthetic vitamins are created in isolated samples, natural vitamins exist as complexes (19). The presence of the additional organic molecules such as phytonutrients, minerals, enzymes, carbohydrates, proteins and lipids found within food substances, enhance the function of that vitamin, affecting its binding affinity and its utilisation. In the absence of these additional co-factors the body needs to draw on its own reserves which can lead to further deficiencies and imbalances in the body. Many examples demonstrate the point - in terms of particle size, oxidant capacity, concentration, vitality - the natural form has greater efficacy *in vivo*.

If 'food' is the means of introducing nutrients, 'nutrition' is the act of using them, and it is sobering to remember that the established relationship between natural nutrients and the human body began well before our species evolved. It is understood to have taken about 250 million years for fish to evolve into amphibians and then into reptiles, a process which occurred on the sea shores, in estuaries and swamps.

Typical nutritional values per gram – Seagreens Food Capsules and Food Granules

<http://www.seagreens.co.uk/University/NutritionalProfileOfSeagreens.aspx>

Protein:
50mg

Fibre/Carbohydrate:

550mg of which Dietary Fibre 500mg (including the non-starch polysaccharides Algin, Fucose, Fucoian, Mannitol, Methylpentosans, Laminarin, Mannuronic Acid and Chlorophyll)

Enzymes (units per gram):

Lipase 254 (pH 7.4), Carbohydrase 53.75 (pH 8.0), Protease 653.50 (pH 7.4)

Essential Fatty Acids (EFA):

Total EPA + DHA Omega-3 1.43mg, Omega-3 3.43mg, Omega-6 9.50mg, Omega-9 16.30mg, Alpha-linolenic Acid 1.143mg, Eicosapentenoic Acid 1.42mg

Vitamins:

A (antioxidant carotenoids including beta carotene, fucoxanthin and violaxanthin) 178µg, B1 (thiamin) 0.62µg, B2 (riboflavin) 0.15µg, B3 (niacin or vit PP) 104.13µg, B9 (folate) 0.554µg, B12 (cobalamin) 0.0014µg, C (antioxidant) 66.35µg, D (cholecalciferol) 0.01µg, E (antioxidant) 62.15µg, H (biotin) 0.30µg, K (menadione) 10µg

Minerals:

Calcium 12.33mg, Magnesium 8.03mg, Nitrogen 8.10mg, Phosphorus 1.58mg, Potassium 19.35mg, Sodium 34.8mg, Sulphur 23.38mg

Trace Elements:

Antimony 0.05µg, Barium 6.48µg, Boron 87.71µg, Cerium 0.27µg, Cobalt 0.47µg, Copper 0.75µg, Germanium 0.07µg, Gold 0.05µg, Iodine 390µg, Iridium trace, Iron 139µg, Lanthanum 0.06µg, Lithium 0.33µg, Manganese 44.9µg, Molybdenum 0.54µg, Palladium 0.76µg, Platinum trace, Praseodymium 0.013µg, Rhemium 0.1µg, Rubidium 6.79µg, Ruthenium 0.004µg, Scandium trace, Selenium 0.04µg, Silicon 63.34µg, Silver 0.064µg, Thallium 0.006µg, Tellurium trace, Titanium 2.15µg, Vanadium 1.79µg, Zinc 70.84µg. A total of 67 mineral elements have been analysed in all Seagreens human food species

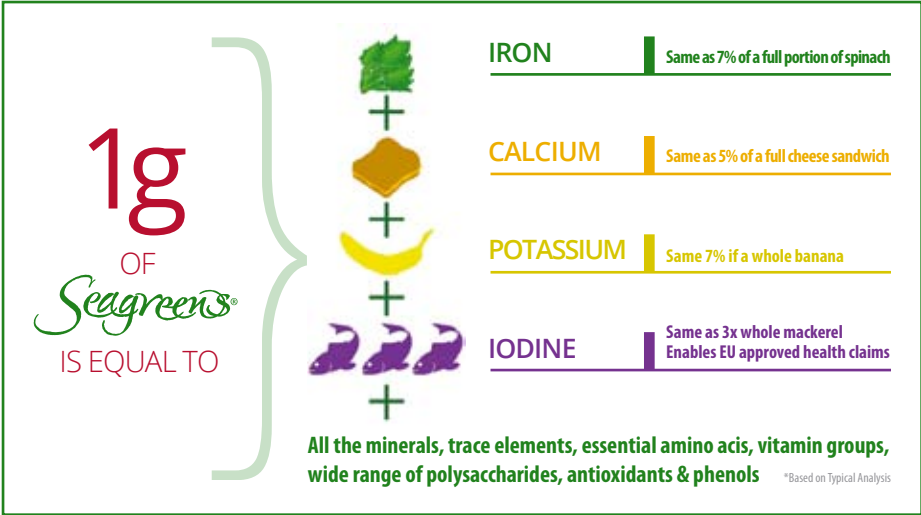
Amino Acids:

Alanine 2.15mg, Arginine 2.88mg, Aspartic acid 7.53mg, Cystine +Cystine 0.83mg, Glutamic acid 5.35mg, Glycine 3.69mg, Histidine 0.53mg, Isoleucine 1.323mg, Leucine 4.74mg, Lysine 1.60mg, Methionine 0.88mg, Phenylalanine 1.36mg, Proline 1.83mg, Serine 1.52mg, Threonine 1.53mg, Tryptophan 0.54mg, Tyrosine 0.85mg, Valine 1.23mg

Betaines:

Glycine Betaine trace, Gamma Amino Butyric Acid Betaine trace, Delta Amino Valeric Acid Betaine trace, TML (Laminine) trace, L-Carnitine trace, Trigonelline trace, and enzymes, lipids, lipoproteins and many compound nutrients which cannot be artificially replicated or formulated.

1g (gram) = 1000mg (milligram) = 1,000,000µg (microgram)



Brand partner Artisan Bread

“When the first terrestrial reptilian vertebrate left the littoral to walk or slither on land, the (nutritional) problems it met were enormous. Its internal composition was established by the environment from which it came, but this reptile no longer could return to the sea to replenish it. This reptile went from an environment of evenly distributed plenitude to one of uneven superabundance and deficiency. For example zinc, copper, iron and manganese were plentiful wherever there was vegetation. Cobalt, molybdenum, fluorine and boron were not distributed uniformly. Therefore to survive, this land-based animal had to adapt not only to conserve essential elements, but to reject excesses of both essential and non-essential elements which could be toxic. Exquisite

homeostatic mechanisms have evolved to achieve this” (homeostasis - the maintenance of a steady optimal concentration of an element in the body) (20).

Cobalt, for example, was not understood to be important to human health until the late 1940s yet today it is recognised as the active center of coenzymes and cobalamins - the most common example of which is the essential vitamin B12.

A recent comprehensive study of mineral depletion tracked 72 foods between 1940 and 2002. Over the years for which precisely

comparable data was available (51 years from 1940-1991) farmed meat lost 41% of its calcium and 54% of its iron, while vegetables lost an average 50% calcium, 25% iron and magnesium, 76% copper and 59% zinc.

In whole milk there was a significant decline in all the essential minerals except sodium. In back bacon not only was there a marked decline in minerals and trace elements, but water content increased by 300%. Turkey and chicken meat lost almost 80% of its iron, beef almost 40%.

The author concluded that the character, growing method, preparation, source and ultimate presentation of basic staples has changed significantly to the extent that trace elements and micronutrient contents have been severely depleted. Concurrently “there has been a precipitous change towards convenience and pre-prepared foods containing saturated fats, highly processed meats and refined carbohydrates, often devoid of vital micronutrients yet packed with a cocktail of chemical additives including colours, flavours and preservatives (21).

Ongoing research has demonstrated a significant relationship between deficiencies in micronutrients and physical and mental ill health (22).

Dietary and therapeutic uses

It may be seen that there are many and varied uses for Seagreens’ Human Food SeaweedTM and theoretically no obstacle to its inclusion at one or more meals each day in the general population - let alone in almost all special diets from the autism spectrum to weight regulation. All this is supported by practitioner and consumer experience and rich anecdotal evidence gained over the past 15 years.

Nutrient comparison of fruit, veg and seaweed* (most nutrient dense species in class)

Nutrient	Fruit	Vegetable	Seaweed
per 100g	raw blackberry	boiled broccoli	dried Ascophyllum
Vitamin B1	0.02 mg	0.05 mg	0.03 mg
Vitamin B2	0.05 mg	0.05 mg	0.75 mg
Vitamin B3	0.50 mg	0.70 mg	2.00 mg
Folate	34.00 mcg	64.00 mcg	60.00 mcg
Vitamin C	15.00 mg	44.00 mg	125.00 mg
Vitamin D	0.00 mcg	0.00 mcg	1.00 mcg
Potassium	160.00 mg	170.00 mg	2500.00 mg
Calcium	41.00 mg	40.00 mg	2000.00 mg
Magnesium	23.00 mg	13.00 mg	700.00 mg
Iron	0.07 mg	1.00 mg	57.50 mg
Zinc	0.20 mg	0.40 mg	13.00 mg
Selenium	trace	trace	15.00 mcg

Dried seaweed contains: 15 times the vitamin B2, 3-4 times the vitamin B3, 3-8 times the vitamin C. 15 times the potassium, 50 times the calcium, 50 times the iron, 30 times the magnesium, an element in which a large proportion of the population is deficient and in which deficiencies are well correlated to high blood pressure. Many elements present in seaweed are not present in fruit and vegetables, namely B12, D and K, trace elements such as selenium and zinc, and polysaccharides such as algin, fucoidan, laminarin and mannuronic acid.

*Data: Food Standards Agency 2008, Seagreens Healthcare Summary 2009

Seagreens in a loaf of bread has approximately the same amount of vitamin B2 as 100g of blackberries or broccoli

Such use is still embryonic in Europe and North America (almost everywhere outside South East Asia) whereas in Japan which was isolated for so long from western influences, seaweed remains a constant feature in traditional and modern food with a traditional daily intake of 4 to 5 grams per day - equivalent to a teaspoon of Seagreens Culinary Ingredient.

Trying to find some data for one of the tables in this article, I stumbled on a short presentation made in Stratford, England to the International Food Industry on New Product Development in 2009. My opening slide then was "The right kind of seaweed in the daily diet may help our bodies to optimize the nutritional value of the food we eat" - an early fruit of our research programme. Four years later I see that I am still banging the same drum!

Myths and misunderstandings still attach to seaweed, some useful, some not, like the one that says the oceans are hopelessly polluted. They are not. We are trying to do the research, set the standards, disseminate and educate - in our own and the public interest. Sometimes even the seals ask what we are doing among these lovely, remote Scottish islands! Time will tell. ■



Seagreens Information Service

... is there to help with any queries you may have and to send you any further information you require. Please contact us on **+44-1444-400403** cheaply from a landline in the UK at **0845-0640040** or at **info@seagreens.co.uk**. The Seaweed Health Foundation is at **www.seaweedhealthfoundation.org.uk**.

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About the authors



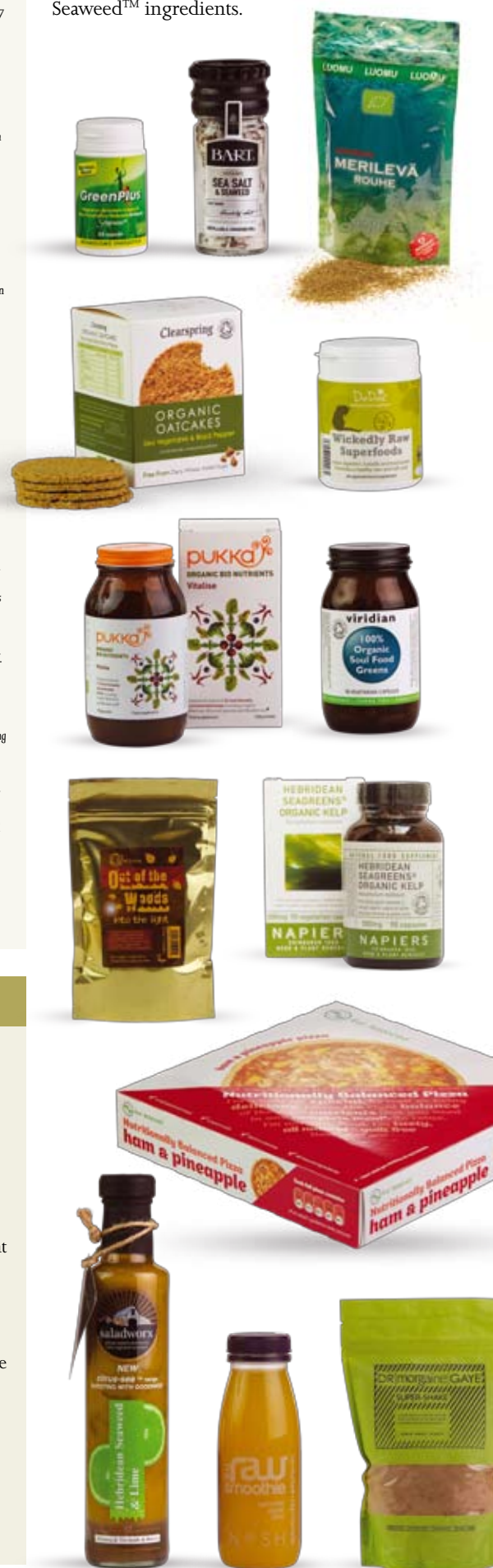
Simon Ranger founded Seagreens® 1997. The company has won awards for its scientific research, consumer and practitioner products and sustainable Organic production certified by the Biodynamic Association. In 2010 Simon set up the Seaweed Health Foundation, an independent non-profit forum for standards, research and education, with centres in Edinburgh and London.



Dr Craig Rose is Executive Director of the Seaweed Health Foundation. He is an advisor to the British Phycological Society's Applied Algae Group, and a director of the Astec Aquaculture Centre, and a guest member of staff at Newcastle University.

Brand Partner Products

Many clean label food and health products now contain Seagreens' Human Food Seaweed™ ingredients.



Seagreens® product range

Our products are designed to be easy to use almost anywhere in the everyday diet - every day! We believe this is what the body needs, not a special 'seaweed' meal even once a week.

All product ingredients are 100% whole Human Food Quality™ wild wrack seaweed from our own award-winning, sustainable production (Patents Pending) except the natural unrefined salt in The Mineral Salt. 100% Certified Organic by the Biodynamic Association, Kosher by the London Beth Din, and Vegan. 100% free from allergens, toxic contaminants, microbial pathogens and GMOs. Nothing added or extracted. Vegetable capsules. Recyclable jars. No fillers, binders, flowing agents, preservatives, colouring or anything else!



Food Capsules & Food Granules

Unique mix of 3 Seagreens species - *Ascophyllum nodosum*, *Fucus vesiculosus* and *Pelvetia canaliculata* - providing a comprehensive balance of all the nutrients. Both the capsules and the granules are in a very fine ground form - an ideal foundation for special diets, nutritional and medical protocols. Used professionally at higher levels in connection with heavy metals detoxification such as dental mercury amalgam and many other therapeutic situations. Recommended daily intake 2 x 500mg capsules with the first meal, or a quarter teaspoon of the granules ideal to mix in smoothies and juices. Also delicious and rather good for you in chocolate!*



Iodine+ Capsules

This single species - Seagreens *Ascophyllum nodosum* - provides approx 350 micrograms iodine in a single capsule, approximately the same as in 2 Food Capsules, plus all the micronutrients required for its metabolism. So if it is mainly the iodine you want, in a natural whole food, with no additives, this is it! Can also be used to increase daily iodine together with Food Capsules or Food Granules. Iodine contributes to normal thyroid, nervous system and cognitive function, the normal growth of children, normal energy-yielding metabolism, and the maintenance of normal skin.

vegetables, or infuse it with lemons and ginger for a refreshing, antioxidant tonic or tea (recipe available). And what a way to replace minerals!



Culinary Ingredient

This is now a Classic and will probably outlive Marmite. 100% Seagreens *Ascophyllum* milled in grains the same sort of size as ground pepper. Use raw with just about everything and in cooking, baking, soups, yoghurt, potatoes, eggs & bacon! Just use it. Launched in 1998 by Seagreens' founder this product suddenly made it possible for Everyone on the Planet - not just in the wonderful Planet Organic - to get seaweed into their daily diet - cheaply, quickly, easily - in or on any and every meal! Enough said.

The Mineral Salt

Better for you than any kind of salt alone, this half-and-half ready-ground blend of Seagreens *Ascophyllum* and Soil Association certified unrefined Cornish Sea Salt in a glass shaker delivers the complete balance of minerals and trace elements - 'twice the flavour, half the salt'. A lovely addition to salad dressings, too!

* Don't take our word for it, though chocolatiers please keep sending us samples! Google the queen of raw foods, the amazing Kate Magic. Her books have lots of Seagreens recipes, some very chocolatey! ■

Salad & Condiment

Dried pieces of Seagreens *Pelvetia canaliculata*, a clever little species growing on the rocks half in, half out of the water. Internal channels hold water while the tide is out - hence its common name Channel Wrack. It is mild, gentle, highly nutritious and children love it. You can eat it as it is, mix with herbs, soak in cold or warm water for 6 minutes and add to salads or

