



CANCER MANAGEMENT WITH SEAGREENS® NUTRITION PRODUCTS

A comprehensive dietary foundation

Seagreens has researched, selected, harvested and produced dried ingredients for human nutrition from native wild seaweeds in the British Isles and Nordic region for 25 years. Its know-how in production, and its analysis of seaweed composition is unrivalled.

Nutritionally, seaweed is different from, and naturally complements, land-grown foods. Where land foods each contain higher levels of limited ranges of nutrients, whether plant or livestock, seaweed contains a little of all the nutrients including minerals and micronutrients which are depleted or absent in land foods. It also contains nutrients found in very few other natural foods, from land or sea. It is a complete food.

Seaweed grows at the 'base' of the land, so that all the minerals, which drain from earth to ocean, are uniquely available to it. It follows that seaweed should not *be* the daily diet, but in small daily amounts it provides an ideal *foundation* of the daily diet.

When food is digested, the digestive process calls for a range of nutrients unlikely to be in the individual food being eaten. Most of these are micro-nutrients, which enable the body to properly digest and metabolise our food and perform hundreds of other daily functions.

Eating therefore places a continual demand upon our nutritional resources. This is all the more crucial during illness, treatment and recovery, in older age and in the amelioration of degenerative diseases including the many forms of cancer.

Carefully produced and blended, and judiciously included in the daily diet, the most nutritious seaweeds provide both the breadth and balance of micro-nutrients that the body needs to function at its best.

The importance of seaweed's richness in minerals cannot be overstated. On a global scale, the loss of dietary minerals from overworked and imbalanced agricultural land, and the predominance of manufactured foods in our daily diet, is only increasing.

Seagreens® specific mineral comparison with other foods

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
Brown rice	110	1,160	520	28	1.3	12.9	NA	16.2
Whole milk	115	140	11	55	Tr	0.1	15	0.4
Cheddar cheese	720	77	25	670	0	0.3	39	2.3
Sirloin steak	9	260	16	49	0.1	1.6	6	3.1
Lentils green & brown	71	940	110	12	1	11.1	NA	3.9
Spinach	170	500	54	140	0	2.1	2	0.7
Bananas	6	400	34	1	0.1	0.3	8	0.2
Brazil nut	170	660	410	3	1.8	2.5	20	4.2
Peanuts	60	670	210	2	1	2.5	20	3.5

*Values for whole foods other than Seagreens® from McCance et al (1993).¹⁶ Abbreviations: NA, no data available. Tr, trace

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Seagreens® are comprehensively more nutrient dense

Fruit, veg and seaweed comparison

Nutrient density in most nutrient dense species in class

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

Nutrient per 100g	Fruit	Vegetable	Seaweed
	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	0.5 mg	0.70 mg	2 mg
Folate	34 mcg	64 mcg	60 mcg
Vitamin C	15 mg	44 mg	125 mg
Vitamin D	0 mcg	0 mcg	1 mcg
Potassium	160 mg	170 mg	2,500 mg
Calcium	41 mg	40 mg	2,000 mg
Magnesium	23 mg	13 mg	700 mg
Iron	0.07 mg	1 mg	57.5 mg
Zinc	0.2 mg	0.4 mg	13 mg
Selenium	trace	trace	15 mcg

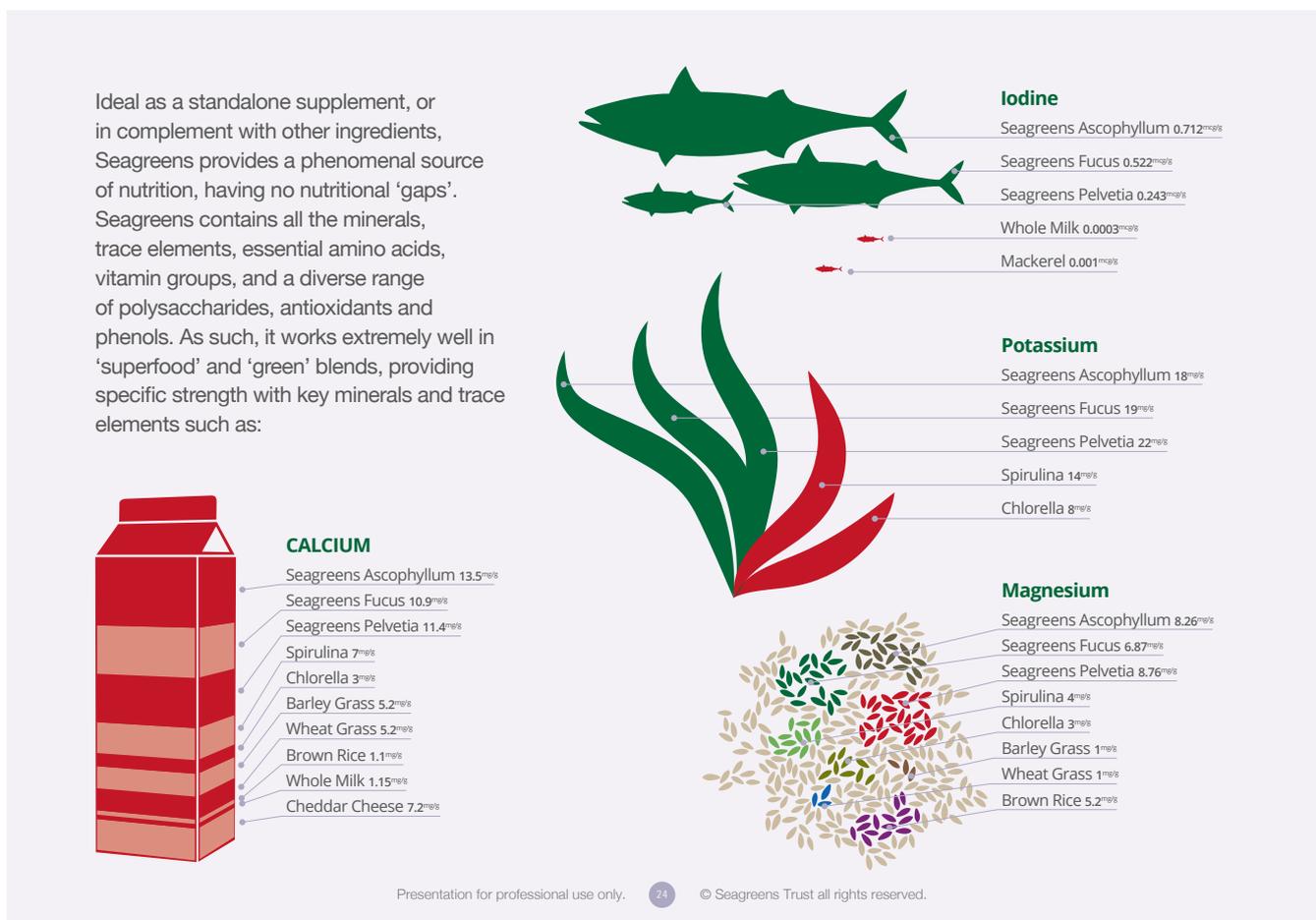
– Food Standards Agency 2008, Seagreens Healthcare Summary 2009

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.

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The same extraordinary nutrient density is reflected in the vitamin balance of the most nutritious seaweed species. They surpass so-called ‘superfoods’ like Wheat Grass, and Chlorella and Spirulina (fresh water microalgae), the table above merely an indication.

The *Wrack species*, in which Seagreens has become an international authority, also have an outstanding balance of Omega 3, 6 and 9 essential fatty acids known as PUFAs.



“Omega 3 and 6 long-chain fatty acids usually derived from fish oil, make up to 5% of the dry matter in nine seaweeds analysed. The highest proportion of these important PUFAs were found in *Ascophyllum nodosum*, *Fucus serratus*, *Laminaria hyperborea*, *Undaria pinnifitada*, *Chondrus crispus* and *Palmaria palmata*” - Cornish M. L., Critchley A. T., and Mouritsen O. G., 2015. *A role for dietary macroalgae in the amelioration of certain risk factors associated with cardiovascular disease*. *Phycologia*,

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Volume 54 (6), 649-666. Professor Mouritsen is an Advisory Member of Seagreens® Seaweed Health Foundation.

Typical analysis	Seagreens® Ascophyllum - Knotted Wrack	Seagreens® Fucus - Bladder Wrack	Seagreens® Pelvetia - Channel Wrack	Seagreens® Palmaria - Dulse	Seagreens® Alaria - Winged Kelp
PUFA	(mg/100g)	(mg/100g)	(mg/100g)	(mg/100g)	(mg/100g)
Total EPA + DHA			270.650		
Omega-3	78.310	111.950		384.400	0.200
Omega-3	169.100	252.900	687.900	406	0.200
Omega-6	512.900	579.650	2068.000	26.2	0.200
Omega-9	1245.000	1044.450	2783.300	81.90	0.200
Omega-3:Omega -6 ratio	0.606 (ratio)	0.416	0.416	15.5	1.480
Alpha-linolenic acid (ALA)	49.500	81.400	269.600	7.14	0.200
Eicosapentenoic acid (EPA) mg/100g	0.500	111.380	269.820	384	0.200
Docosapentaenoic (DPA)	0.400	0.785	0.2	2.040	0.200
Docosahexaenoic (DHA)	0.500	0.970	0.2	0.40	0.200

Countering degenerative diseases

Early in our research, dried ground wild Wrack seaweeds were found not only to be a healthy replacement for salt, but to act as an antidote to the harmful effects of excessive salt intake (any sea or rock salt is at least 96% sodium chloride).

UK Government-sponsored salt replacement research at the Centre for Food Innovation in Sheffield (2008-10), found that Seagreens® was effective and beneficial as a natural preservative because it created an alkaline environment in which pathogenic bacterial colonies could not reproduce themselves.

The research also concluded that Seagreens® as a food ingredient is safe and acceptable to consumers in everyday foods such as bread and meat, meaning its dense nutrition and rich mineral content can underpin human nutrition on a daily basis.

The whole idea of Seagreens® nutrition products in cancer management, is that they are very easy to include in any meal at any time of day, normally to achieve up to 4 grams (a heaped teaspoon) per day. Inclusion can be in capsule form, or by adding fine or medium ground ingredients to foods and drinks, or larger pieces.

Nutrition has a place in most degenerative diseases

“...risk of stomach cancer in men with a low-salt intake of 4g to 6g daily was 1 in 1,000 per year, but double in men consuming 12g to 15g per day. The risk for women on a low-salt diet was 1 in 2,000 per year but on a high level diet increased to 1 in 1,300”

– Japanese study reported in the *British Journal of Cancer* (*The Week*, Health & Science section, Issue 443, 17.01.04).

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Organoleptic studies conclude salt replacement research

Amount of Seagreens per 400g loaf	0g		5g		10g		15g		20g	
	M	SD	M	SD	M	SD	M	SD	M	SD
Appearance	6.42 ^a	1.80	6.46 ^a	1.58	6.41 ^a	1.38	6.58 ^a	1.38	6.45 ^a	1.39
Aroma 6.38 ^a	1.55	6.14 ^a	1.45	6.06 ^a	1.53	6.30 ^a	1.55	6.09 ^a	1.44	
Flavour 6.31 ^b	1.83	5.56 ^a	1.74	5.50 ^a	1.74	5.67 ^{ab}	1.65	5.52 ^a	1.75	
Aftertaste [¥]	6.34 ^b	1.67	5.58 ^a	1.59	5.63 ^a	1.59	5.70 ^a	1.50	5.54 ^a	1.70
Texture 6.44 ^a	1.80	5.94 ^a	1.62	6.14 ^a	1.62	5.92 ^a	1.72	6.00 ^a	1.71	
Overall Acceptability [§]	6.60 ^b	1.68	5.79 ^a	1.52	5.95 ^a	1.52	5.93 ^a	1.59	5.86 ^a	1.64

Data are presented as means and standard deviations. Different letters in the same row denote means that are significantly different to one another ([†]p = .008, [¥]p=.003, [§]p=.002).

For the first time, this study has shown that seaweed enriched bread, a high fibre food, is acceptable when up to 20g SG are added to a 400g loaf. Previous studies have included alginate in drinks^(2-3,5) and foods^(4,9), and most authors⁽²⁻⁵⁾, but not all⁽⁹⁾ have reported beneficial health effects at levels similar to those found in SG enriched bread. Seaweed presents an attractive option for food manufacturers who are keen to maximise the health-giving potential of their dietary fibre rich products. This work was supported by Simon Ranger (Seagreens Health Foundation) with funding from the Weight Management Foundation. With thanks Paul Ash and Chris Trueman for their assistance.

“Up to 5% Seagreens® Ascophyllum enriched bread acceptable to consumers”

Higher levels do not deter consumers, but subsequent taste studies confirm that:

- Choice of Seagreens ingredient is important - medium sized granules preferred
- Some salt is needed for mass consumption - 50% seaweed / salt blend preferred

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Replacing daily salt is a typically easy way to introduce dietary seaweed. The Mineral Salt contains 50% Wrack seaweed, which Japanese research showed, averted heart disease in rats, when the level of salt would normally cause cardiac arrest. The Ruby One, contains only 25% salt. Seagreens® Culinary Ingredient is 100% milled seaweed.

Research at Newcastle University (2012) found Seagreens® also to have previously unknown levels of antioxidants which are 'free radical scavengers' throughout the body.

A high antioxidant tea or tonic using Seagreens® Pelvetia Pieces with lemons and fresh ginger, was devised by Dr Jane Jamieson in Edinburgh for use in cancer management. *(Recipe on request)*

These findings were supported by research at Teeside University (2012) which found Seagreens® to aid the digestion and uptake of nutrients from food, assisting a clean digestive system with reduced toxic cellular waste.

Seagreens® benefits the digestive tract in a number of ways, and compromised nutrient absorption may be a particular concern in cancer management.



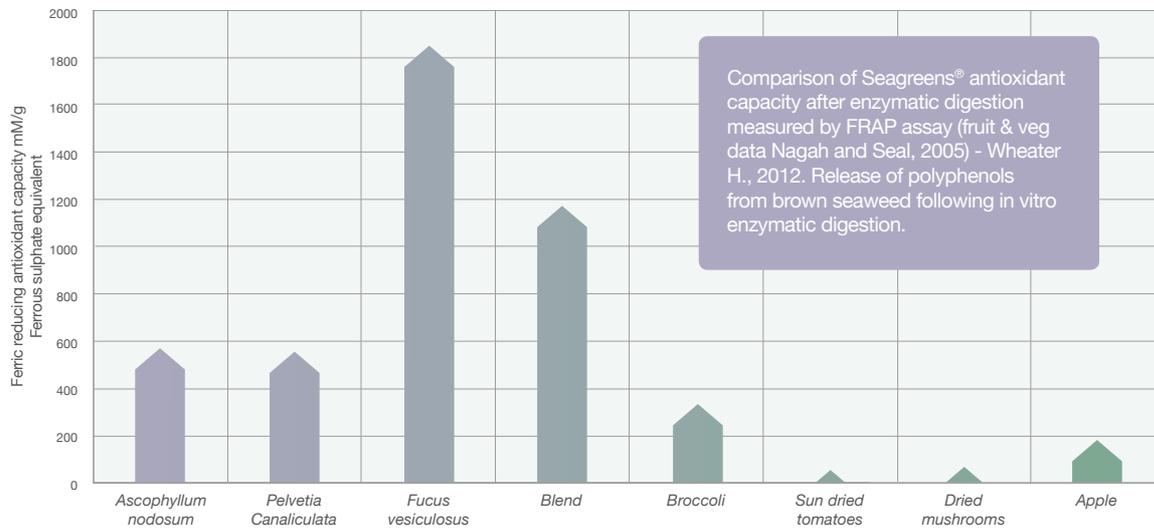
The seaweed is a natural food for beneficial gut bacteria, and antagonistic to pathogenic bacteria, so it helps balance the gut microbiome and is an ideal complement when using probiotics.

Its antioxidants assist the removal of toxic waste and its polysaccharides aid in healing the gut endothelial lining. Its mineral richness helps balance and cleanse the blood.

A study at Glasgow University (2014) found Seagreens® to be an ideal natural source of iodine and to have no adverse effect on the thyroid.

The brown seaweeds contain significant levels of active anti-cancer agents, of which the polysaccharides (such as fucoidan) and the soluble mineral iodine, have been the subject

Antioxidant studies – capacity and behaviour 2012



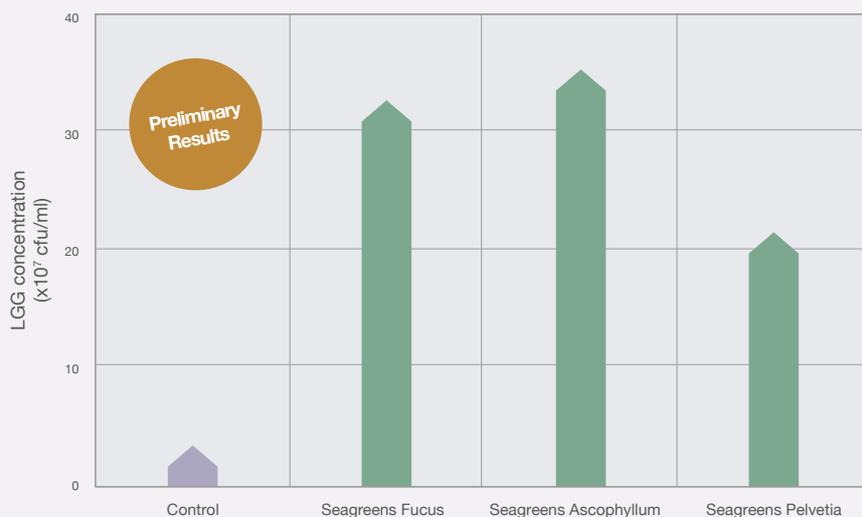
Comparison of Seagreens® antioxidant capacity after enzymatic digestion measured by FRAP assay (fruit & veg data Nagah and Seal, 2005) - Wheeler H., 2012. Release of polyphenols from brown seaweed following in vitro enzymatic digestion.

Significant in vitro evidence as potential agents in prevention and treatment of diabetes and obesity. Rich sources of polyphenols, could be more effective radical scavengers than green tea. High antioxidant capacity survived initial digestion, could protect against oxidative damage in the gut. Antioxidant studies - capacity and behaviour 2012

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Prebiotic and digestive studies

Use of wholefood Seagreens species as effective prebiotics; demonstrated with Lactobacillus (LGG)



Increased good bacteria (*Lactobacilli*). Reduced bad bacteria (*E. coli*). Probable reduced oxidative stress from improved balance nitric oxide and reactive oxygen species (ROS). Supports results in livestock (e.g.. improved digestion and feed utilisation in dairy cows).

Nutrition studies at Sheffield Hallam, Glasgow and Newcastle universities

- Lyons V. Seagreens® as a potential prebiotic and the role of probiotic bacteria in the production of nitric oxide in macrophages. MSc Thesis, Teeside University, 2012

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of international research during the past two decades (including Jang-Su Park et al., 2002; Teas et al., 2009; Eng-Guan Chua et al., 2015).

The benefits of iodine in cancer prevention and treatment have been widely explored on both sides of the Atlantic and in Japan, and notably by Donald W. Miller, Jr, MD, Professor of Surgery at the University of Washington, Seattle (Caduceus, Issue 75, 2008) and by Dr David Brownstein, MD, Medical Director for the Centre for Holistic Medicine in West Bloomfield, Michigan (Caduceus, Issue 92, 2016).

As little as 65mg Seagreens® per day contributes to health

Key Findings

- Asymptomatic young women in the UK with low dietary seafood and dairy, display marked iodine deficiency.
- Seagreens® boosts iodine intake by 60% with no adverse affect on thyroid hormones or function (500mg Seagreens Ascophyllum Fine Granules per day). About 33% absorbed.
- Seagreens iodine uptake limited in the first gastric and intestinal phases of digestion. Colonic fermentation shown to free iodine from the seaweed matrix in the intestine.
- Upper tolerable limits for daily iodine intake EU 600µg, USA 1100µg.
- Iodine contributes to the normal production of thyroid hormones, normal thyroid function, nervous system and cognitive function, the normal growth of children, normal energy-yielding metabolism, and the maintenance of normal skin.

- *Combet et al., 2014. Low level seaweed supplementation improves iodine status in iodine-insufficient women. British Journal of Nutrition.*

As long ago as 2009, Professor Jane Teas found that regular seaweed consumption caused beneficial changes in oestrogen and phyto-oestrogens in healthy post-menopausal women which could reduce susceptibility to breast cancer.

Several studies have reported that high blood counts of estradiol increase the risk of breast cancer and the risk of recurrence, and that brown seaweed in the traditional Japanese diet may explain the low incidence of breast cancer there.

The polysaccharides have been shown to inhibit the growth of tumours and the cellular adhesion of cancer-forming bacteria.

Japanese research highlights another important benefit in debilitation from cancer and treatment as well as old age, which can lead to loss of taste, dry mouth, nutrition and weight loss. The distinctive 'umami' flavour of seaweed appears to stimulate taste receptors in the gut as well as the mouth, stimulate salivation and help reverse this detrimental cycle.



Seagreens[®] flavour benefits digestion, particularly in the elderly

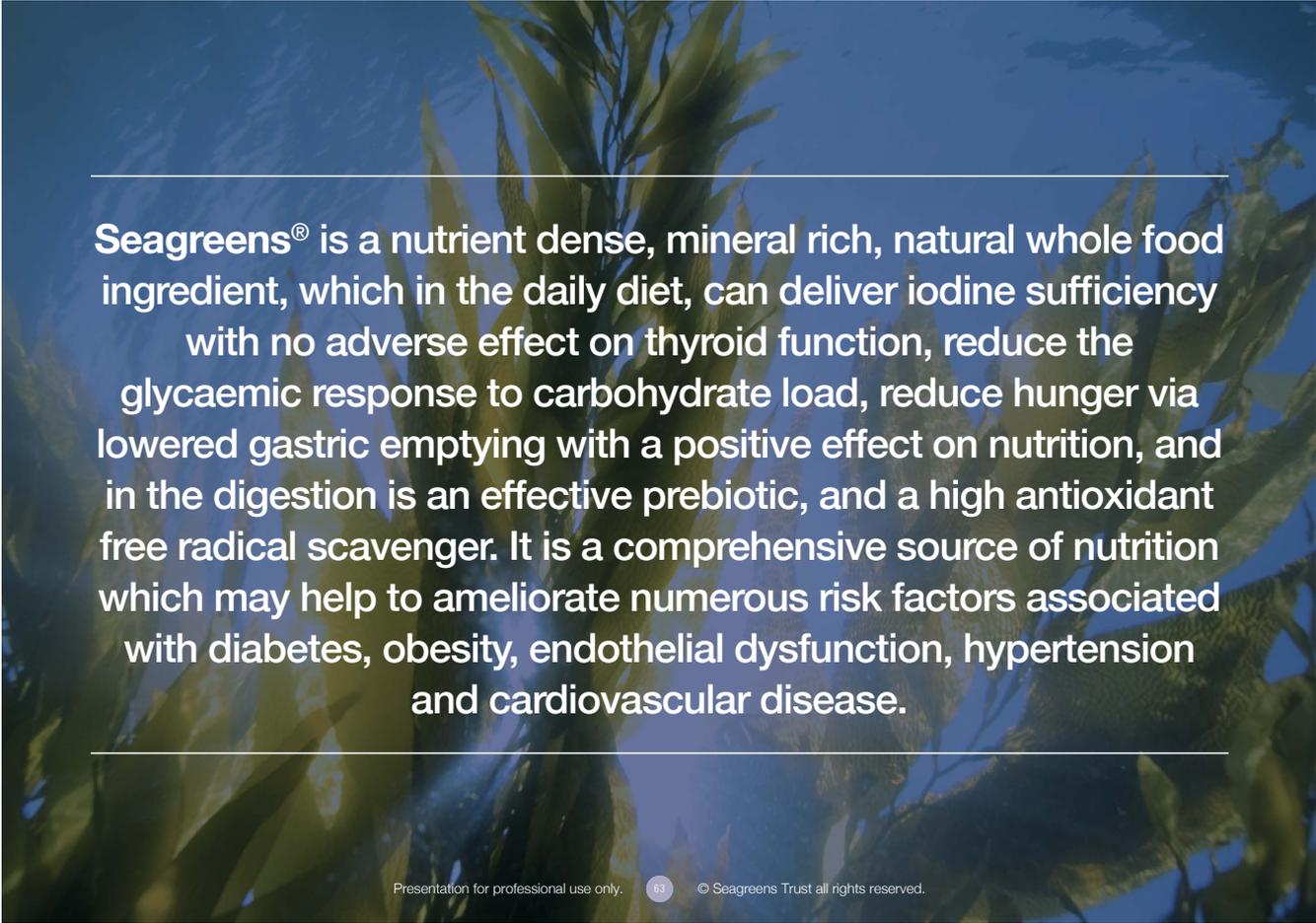
“Many of my patients are on restricted diets, and they often complain that the food is ‘bland’ and lacking flavour. By using the Seagreens[®] condiments they will still be able to enjoy a flavoursome diet.”

- Helen Heap, Nutritionist, Women's Nutritional Advisory Service (dietary advisory service specialising in PMS, the Menopause, and IBS), England, April 1999 Seagreens[®] flavour benefits digestion, particularly in the elderly

FLAVOUR ENHANCEMENT

Brown Wrack seaweed adds the fifth 'umami' flavour which increases salivation and taste, and improves digestion. In the elderly and infirm, umami has been shown to significantly improve appetite, weight gain and general health.

- Sasano, T., et al., 2015. Umami in oral and overall health. *Flavour*, 4:10.



Seagreens® is a nutrient dense, mineral rich, natural whole food ingredient, which in the daily diet, can deliver iodine sufficiency with no adverse effect on thyroid function, reduce the glycaemic response to carbohydrate load, reduce hunger via lowered gastric emptying with a positive effect on nutrition, and in the digestion is an effective prebiotic, and a high antioxidant free radical scavenger. It is a comprehensive source of nutrition which may help to ameliorate numerous risk factors associated with diabetes, obesity, endothelial dysfunction, hypertension and cardiovascular disease.

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Seagreens® nutrition products support therapeutic protocols at cancer centres in the British Isles and North America. Based on the indications of research to date, Seagreens® can be said to be of nutritional benefit in all forms of cancer, at up to 4 grams daily (a full teaspoon or 8x500mg Food Capsules best taken in the earlier part of the day) and, with the professional advice of a competent nutritional therapist, at higher levels of daily intake during all forms and periods of treatment.

You can explore using Seagreens® nutrition products in your daily diet at www.seagreens.shop, in the United States at www.seagreensonline.com.

If you have any questions or concerns we are always happy to hear from you at info@seagreens.co.uk.

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