



ALGET 2 - Quality Algae from Sea to Consumer

Quality and Regulatory Standards from Shore to consumers

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**Development of seaweed seasonings
for the American public
satisfying
agreed food safety criteria**

Fiona Houston, Mara Seaweed, Edinburgh

Dr. Duncan Wood, IAS, Washington, DC



Seaweed is a delicious, nutritious and healthy alternative to salt.

It has been in Asian diets as a standalone for centuries.

It has been ubiquitous in western diets as an additive or extract throughout 20th & 21st centuries.

Dr Elizabeth Blackburn Nobel Prize Winner for Medicine

Daily Mail, Friday, January 20, 2017

By **Victoria Allen**
Science Correspondent

SEVEN hours of sleep a night, seaweed and cups of coffee could hold the key to staying young.

But too many fizzy drinks can age you as fast as smoking, making parts of the body almost five years older biologically.

That is the advice from the biologist who won the Nobel Prize for discovering telomeres – the 'shoelace caps' at the end of chromosomes now known to determine how well or badly someone will age. Telomeres, which differ in length by a tiny fraction of a millimetre, can predict someone's risk of cancer and Alzheimer's. Dr Elizabeth Blackburn warns these telomeres are being rapidly worn down by, among other things, chronic stress, yo-yo dieting, white bread and sugar.

But a Mediterranean diet, vitamin-rich seaweed and a few cups of coffee a day might help to make them longer again. Telomeres are important as one of the key reasons for ageing because, much like the plastic caps which protect the end of shoelaces, they stop chromosomes which house our DNA from fraying, which causes ageing and disease.

Dr Blackburn and health psychologist Dr Elissa Epel have now put together advice on how to live which does not rely on fad diets but is taken from years of research on telomeres in humans. Dr Blackburn said: 'The lessons from re-

Sleep, coffee and seaweed: Nobel winner reveals tips to staying young

Coffee helps it could

Seaweed 'is natural way to protect the heart' as algae helps bring down blood pressure

By [SOPHIE BORLAND FOR THE DAILY MAIL](#)

UPDATED: 20:51, 21 July 2011

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[View comments](#)

It's hardly the most appetising vegetable side dish.

But tucking into a clump of seaweed at dinner time could help stave off heart attacks, say researchers.

They have discovered key ingredients in the plant that help lower blood pressure, similar to commonly prescribed drugs.

According to a major study, seaweed is a rich source of proteins known as bioactive peptides – which are also found in milk.

These chemicals have a similar effect to ACE inhibitor drugs, which are widely prescribed to help lower blood pressure and prevent heart attacks and strokes.

Seaweed is rarely eaten in Britain but has been a staple of the Japanese diet for centuries.

home without the stress of a strange boyfriend being brought over," Mr Richardson said.

Food industry's failure to reduce salt is costing thousands of lives

Chris Smyth Health Editor

Thousands of people have died unnecessarily because the food industry was allowed to give up on Britain's salt reduction drive.

The decision to abandon targets on cutting salt in food for four years cost 5,000 lives a year by taking the pressure off companies to make healthier products, according to calculations published in the *BMJ*.

"It's a tragedy because of all these people who would be living now but are not because we haven't reduced salt as much as we would want," said Graham MacGregor, professor of cardiovascular medicine at Queen Mary University of London and the chairman of the consensus Action on Salt and Health. "It is almost like the Department of Health is on the side of the food industry, not the consumer."

MacGregor added: "The food industry is the largest and most powerful industry in the world. Most of the foods that it produces provides are very high in salt,

fat and sugars, causing increased risk of strokes, heart failure and heart attacks, and predisposing to cancer."

Companies voluntarily cut up to 40 per cent of the salt in many foods from 2003 under a deal with the government that saw the average Briton's salt intake fall by 15 per cent to 8.1g a day and is estimated to have saved 9,000 lives a year.

Professor MacGregor says that this progress came to a halt when Andrew Lansley became health secretary in 2010. Targets for further reductions were restored in 2014 by a new ministerial team, but Professor MacGregor argues that this means that four years of reductions were lost. If progress had continued at the same rate, 6,000 deaths a year would have been avoided, he and his colleagues argue.

"If you could save thousands of lives with some new treatment everyone would say it's fantastic. But you can do it with public health for virtually nothing," he said. "It's very frustrating when someone like Andrew Lansley comes in and completely messes up one

of the leading nutritional programmes in the world."

Regulation is needed to force salt down further, says Professor MacGregor. "Robust mechanisms should be set up immediately to control the food industry in a similar way to the tobacco industry," he said.

Susan Jebb of the University of Oxford, who chaired the government's deal with the food industry, denied that efforts had been abandoned. While conceding that action could have been faster, she pointed out that Professor MacGregor's calculation "assumes that all action stopped and salt in food plateaued... I don't think Graham has provided any evidence that that work stopped."

Barbara Gallani, of the Food and Drink Federation, said: "Voluntary action by companies over the past decade has helped to reduce adult intakes of salt by 15 per cent and further work is ongoing to help consumers meet dietary recommendations.

"It's common sense that food produc-

ers should be involved in shaping a salt reduction strategy as only a thorough understanding of ingredients and recipes can result in stretching realistic targets... Having made good early strides to reduce salt in products, many companies are finding reductions harder to achieve without compromising product safety or jeopardising taste, texture or shelf-life.

● The benefits of switching from a high-fat to high-fibre diet can be seen after only two weeks, according to a study. Scientists asked volunteers in America, with diets high in protein and fat but low in fibre, to swap their eating patterns with volunteers in rural Africa whose diets were high in fibre and low in fat and protein. The new diet has long been thought to reduce the risk of colon cancer. After a few weeks the US volunteers had significantly fewer early warning signs of cancer while signs in the African group had dramatically increased. The study was published by the University of Pittsburgh and published in *Nature Communications*.

The UK and Europe are iodine-insufficient


Dietary interventions and increase of dietary iodine intake – a systematic review

M. Bouga and E. Combet

Human Nutrition, School of Medicine, College of Medical Veterinary and Life Sciences, University of Glasgow, Glasgow Royal Infirmary, Glasgow, UK


Young UK women are iodine-insufficient at a population level⁽¹⁾. No prophylactic measures address this issue, which impacts on maternal thyroid function and infant neurodevelopment. The UK Department of Health has not reviewed the iodine recommendations for pregnancy and lactation and proposes no increment, in contrast to the WHO/ICCIDD and EFSA which recommend an increase of iodine intake from 150µg/day to 250µg/day and 200µg/day respectively. As controversial salt iodisation is not mandatory in the UK, and as the pregnancy supplements provided by the health services do not contain iodine, pregnant mothers and their infants may be at risk of iodine deficiency disorders. Iodine knowledge and awareness remain low amongst mothers⁽²⁾ and healthcare professionals. Randomised controlled supplementation trials present ethical difficulties in pregnancy. We propose that simple dietary guidance, such as repositioning dairy and seafood as essential component of the diet during pregnancy and lactation, can address this public health concern.

Seaweed provides iodine in a natural healthy way






a good source of iodine

Just 1 teaspoon of Mara Seaweed provides 100% of an adult's Recommended Daily Intake (RDI) of iodine.

 = 1.5g = 100% RDI

mara SEAWEED
NOURISH BODY & SOUL
www.maraseaweed.com



A new reality

**2017-19 highlighted a revolutionary
shift in global food policy**

A new food reality

**BBC Broadcaster David Attenborough's
2017 Blue Planet was a game-changer for oceans**

**“Young people's concerns for the planet are a great
source of hope.”**

“To chuck plastic into the ocean is an insult.”

**David Attenborough Testimony to House of Commons
Committee on Business, Energy & Industrial Strategy,
2019**

A new food reality

Consumers are environmental campaigners

**Vegetarians, Vegans and sustainability rule the
food world right now**

600% rise in vegans in 3 years.

Dairy Farmers are in trouble for CO² emissions

**Seaweed Industry bad press for mechanical
harvesting from the seabed**

seen as environmentally damaging by public

Even Royalty in trouble for flying a private jet

A new food reality

A technical revolution in food distribution in 2017

Amazon-Whole Foods merger \$13.7 billion

Blue Apron IPO \$2 billion

Hello Fresh IPO \$1.8 billion

Tesco – World's 3rd largest supermarket focus on cross-selling via its digital database

Ecommerce & nationwide fulfilment centers bring sustainably sourced fresh foods straight to our door

Amazon-Whole Foods

2017 Amazon-Whole Foods merger

Whole Foods purchased for \$13.7 billion

E-commerce giant controls 100s of stores

Transforms grocery shopping

key trend is cross-platform selling

A new food reality

In today's consumer movement

Social media shapes public opinion on food safety faster than the regulatory process.

This means it is possible to follow all the rules and still fail in public opinion and fail your customers.

A new legislative food mandate for USA

**The Public Health Security & Bioterrorism
Preparedness and Response Act 2002**

**& The Food Safety Modernization Act
(FSMA) 2011**

**Legislation extends US jurisdiction overseas
into foreign facilities.**

The Public Health Security & Bioterrorism Preparedness & Response Act

The act directs the Food and Drug Administration (FDA) to require food facilities including importers and foreign suppliers to:

- Register with the FDA.**
- Provide the FDA with advance notice of shipments of imported food.**
- Update FDA Online Account Administration (FDA OAA) Account profile every 3 months.**

The Food Safety Modernization Act

In 2018 US Food & Drug Administration implemented the Food Safety Modernization Act (FSMA) 2011 for all food businesses.

The act requires a food safety plan including an analysis of hazards and risk-based preventive controls to minimize or prevent identified hazards.

Includes importers & foreign suppliers and has special provisions known as:

The Foreign Supplier Verification Program

to verify foreign suppliers and the safety of the food they produce.

Foreign Supplier Verification Program

Identify the FSVP importer of record on all entry documents with Duns # & Food Facility Registration #.

FSVP importer is responsible for establishing foreign supplier verification programs to verify:

- Food safe process
- Food is unadulterated
- Food is not misbranded
- All the above verified by “qualified individual”

Foreign Supplier Verification Program

Typical FSVP activities:

- 3rd party onsite audit
- 3rd part corrective action plan
- sampling and testing of food
- review of the foreign supplier's relevant food safety records
- other activities that are appropriate based on the evaluation of the risk posed by the food and the foreign supplier performance.

Examples: FSVP in Action

Control and Type of Hazard

There are two key points to a verification program: hazard type and control.

Hazard type is going to inform you what the verification activity will need to be. If you identify a hazard as SAHCODHA that's reasonably likely to occur, then you're looking at the highest level of verification activities (i.e., on-site audits either from the importer or from accredited third-parties). If you don't have a SAHCODHA hazard, then there are more options available as mentioned above.

Once identified, who controls the hazard? Depending on who (e.g., importer, customer, or foreign supplier) controls the hazard, you can then determine the steps needed for verification activities.



Using the example above, if the hazard is determined to be SAHCODHA, then you will conduct an on-site audit; if not, there are other methods available like looking at a supplier's compliance history to ensure the supplier is adequate at controlling the identified hazard. For example, if said supplier has a Form 483, you may be able to deduce that they aren't very good at conducting pH testing.

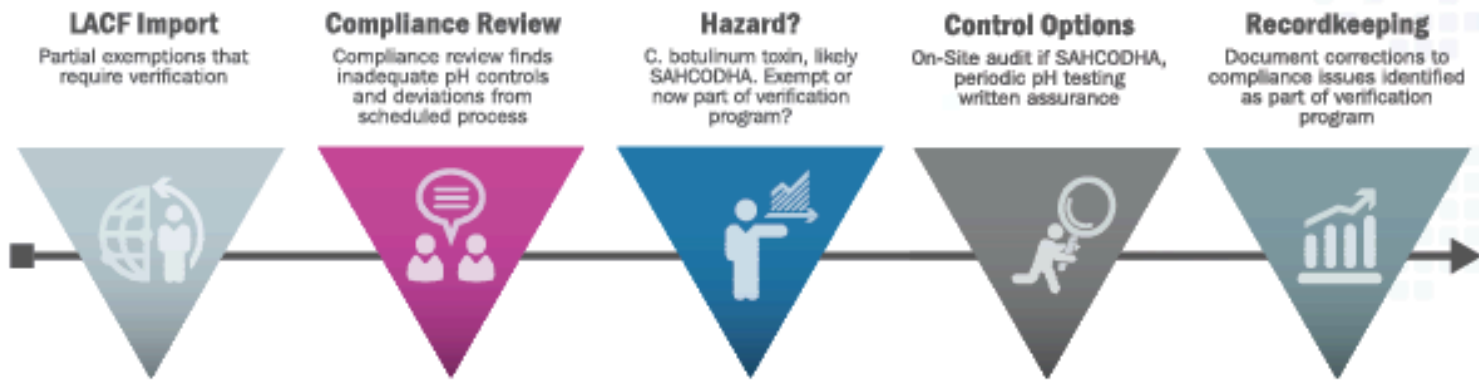
If you determine the history is unsatisfactory, you will need to factor that in to determine the appropriate verification activity. In some instances, you might want to even escalate it to an on-site audit.

Example of Serious Hazards

Should you do an on-site audit? 📍



An example of foreign supplier's compliance history when the supplier has had issues of controlling the hazard:



US Food-Tech Customer Requirement 1

**Two types of imported seaweed
seasoning that taste great and
provide a healthy nutritional boost.**

Kombu

Dulse

Requirement 2

Meeting all regulatory requirements of the Public Health Security Act and the Food Safety Modernization Act with a complete Foreign Supplier Verification Program

Requirement 3

Allergen Statement on every shipment

- **Zero Crustacea Detected**
- **Allergen Free**

Requirement 4

Certificate of insurance:

- **\$8 million excess liability cover**
- **\$2 million general liability per occurrence**
- **Workers compensation liability \$1 million per occurrence**

What was available to Mara?

Wild Seaweed with trace crustacea

Farmed Seaweed with trace crustacea

Dried Seaweed with trace crustacea







Mara Seaweed Design philosophy

Award Winning Branding

Tastes great

Nutritious

Approved Health Claims

Food Safety & Sustainability Certifications

Foreign Supplier Verification Program

Crustacea Free

High US Product liability protection

Meeting US Tariff requirements for seaweed

Meeting public opinion's sustainability & safety requirements

Design Production Process to meet criteria

Crustacea Free to meet criteria

Crustacea testing Matrix

Date	Product	Batch	Barrel	Tested?	Clear?	Comments
19-01-17	PP	PAL 17/16	462	Y	N	Identified & separated from other products
19-01-17	PP	BOL	611	Y	Y	
19-01-17	PP	BOL	612	Y	Y	
19-01-17	PP	PAL 19/16	625	Y	Y	
19-01-17	PP	PAL 20/16	632	Y	Y	
19-01-17	PP	BOL	509	Y	Y	
19-01-17	PP	PAL 19/16	655	Y	N	Identified & separated from other products
19-01-17	PP	PAL 19/16	654	Y	Y	
19-01-17	PP	BOL	613	Y	N	Identified & separated from other products
19-01-17	PP	BOL	614	Y	N	Identified & separated from other products
19-01-17	PP	BOL	615	Y	Y	
19-01-17	PP	BOL	616	Y	Y	
19-01-17	PP	BOL	617	Y	N	Identified & separated from other products
19-01-17	PP	BOL	618	Y	N	Identified & separated from other products
19-01-17	PP	BOL	620	Y	Y	
19-01-17	PP	BOL	619	Y	Y	
19-01-17	PP	PAL 17/16	640	Y	Y	
19-01-17	PP	PAL 17/16	641	Y	Y	
26-01-17	PP	PAL 20/16	622	Y	Y	
26-01-17	PP	PAL 21/16	634	Y	Y	
26-01-17	PP	PAL 22/16	645	Y	Y	
26-01-17	PP	PAL 20/16	625	Y	N	Identified & separated from other products
26-01-17	PP	PAL 20/16	623	Y	N	Identified & separated from other products
26-01-17	PP	PAL 18/16	647	Y	Y	
26-01-17	PP	PAL 23/16	639	Y	Y	
26-01-17	PP	PAL 23/16	638	Y	Y	
26-01-17	PP	PAL 18/16	649	Y	Y	
26-01-17	PP	PAL 21/16	627	Y	Y	
26-01-17	PP	PAL 21/16	633	Y	Y	
26-01-17	PP	PAL 18/16	651	Y	N	Identified & separated from other products
26-01-17	PP	PAL 18/16	650	Y	N	Identified & separated from other products
26-01-17	PP	PAL 20/16	629	Y	Y	
26-01-17	PP	PAL 20/16	631	Y	Y	

Supplier Information Requirements

MANUFACTURING FOOD SAFETY <i>(if applicable)</i>	YES	NO	N/A
Do you have a documented food safety policy?	✓		
Has a food safety risk assessment been undertaken?	✓		
Do you have a food safety plan, product protection program, risk management plan, HACCP, or other food safety system currently in place?	✓		
Do you have Current Good Manufacturing Practices (CGMP) implemented in the facilities? If not, do you have any of the following practices implemented below?	✓		
(a) Handwashing	✓		
(b) Employees donning smocks, or disposable “clean” garments	✓		
(c) Hairnets, and beardnets that employees utilize	✓		
(d) No food, or drink allowed on the production floor	✓		
(e) Cleanliness expectations as it relates to fingernails, hair, clothing	✓		
Do you have current Sanitation Standard Operating Procedures (SSOPs) in place?	✓		
Do you have an employee food safety-training program in place?	✓		
Do you have an employee hygiene program or employee illness program?	✓		
Do you have full traceability of your materials and finished and distributed products?	✓		
Do you have a pest control program in place?	✓		
Do you have a shelf-life analysis report done for each perishable product sold?	✓		

MANUFACTURING FOOD SAFETY (if applicable)	YES	NO	N/A
Do you have a documented food safety policy?	✓		
Has a food safety risk assessment been undertaken?	✓		
Do you have a food safety plan, product protection program, risk management plan, HACCP, or other food safety system currently in place?	✓		
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Do you have an employee hygiene program or employee illness program?	✓		
Do you have full traceability of your materials and finished and distributed products?	✓		
Do you have a pest control program in place?	✓		
Do you have a shelf-life analysis report done for each perishable product sold?	✓		

Food safety and sustainability certifications



Multiple Third Party accreditations:



Multiple Accredited references:

Design challenges 1

Food safe supply is Vital

Mara Seaweed needs harvested seaweed to reach the Mara factory in food safe condition.

Design challenges 1 continued

Food safe supply is Vital

This requires seaweed harvesters and farmers to focus on basic food safety from sea to factory door.

Think basic dairy farm hygiene against psychotropic (cold-loving $<44.6^{\circ}\text{C}$) microbacteria:

EG: E Coli, Listeria, Yersinia

This needs to be treated as a more important daily challenge than heavy metals because microbacteria can grow and contaminate a factory.

Design challenges 2

Differing International Toxic (Heavy) Metal & Iodine Standards & measurements

- **International Codex Alimentarius**
- **US Food and Drug Administration**
- **US Agency for Toxic Substances & Disease Registry**
- **EU Guidance in (EC) No 1881/2006 sets maximum levels for certain contaminants in foodstuffs and exempts seaweed from default maximum levels for lead and cadmium**

**International UN Food Standards
-WHO Codex Alimentarius Commission
General Standard for Contaminants and
Toxins in Food and Feed
(Codex Stan 193-1995)**

- **Includes maximums for five heavy metals:**
- **Arsenic**
- **Cadmium**
- **Lead**
- **Mercury (& methylmercury)**
- **Tin**

EU Commission Regulation No 1881/2006 – maximum levels for certain contaminants in foodstuffs

- **Includes four heavy metals:**
- **Cadmium**
- **Lead**
- **Mercury**
- **Tin**

Commission Regulation EU No 420/2011 amending Commission Regulation No 1881/2006 Exempts Seaweed from default maximum levels

30.4.2011

EN

Official Journal of the European Union

L 111/3

COMMISSION REGULATION (EU) No 420/2011

of 29 April 2011

amending Regulation (EC) No 1881/2006 setting maximum levels for certain contaminants in foodstuffs

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Council Regulation (EEC) No 315/93 of 8 February 1993 laying down Community procedures for contaminants in food ⁽¹⁾, and in particular Article 2(3) thereof,

Whereas:

(1) Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs ⁽²⁾ sets maximum levels for contaminants in a range of foodstuffs.

(5) The provisions for leafy brassica should be aligned with those of other leaf vegetables. Leafy brassica should therefore be excluded from the default maximum level for cadmium in 'vegetables and fruit' in point 3.2.15 and should be included in point 3.2.17.

(6) The default maximum levels for lead and cadmium in fruit and vegetables are not realistic for seaweed, which can naturally contain higher levels. Seaweed should therefore be exempted from the default maximum levels for lead and cadmium in fruit and vegetables (points 3.1.10 and 3.2.15). More occurrence data should be collected to decide about the need for specific more realistic maximum levels for lead and cadmium in seaweed.

Heavy Metal & Iodine Standards adopted in France based on EU guidance

	Maximal level (mg/kg dry weight)
Inorganic Arsenic (As)	3
Cadmium (Cd)	0,5
Mercury (Hg)	0,1
Lead (Pb)	5
Tin (Sn)	5
Iodine (I)	2 000

Table 2. Maximal level of heavy metals and iodine authorized in seaweeds (mg/kg dry weight)

Design challenges 3

Tariff Free or Low-Tariff import

US Trade War with Europe over Airbus & Boeing

- WTO ruled that EU and US violated world trade rules regarding subsidies to aerospace**
- Now there are tariff countermeasures between EU and America using food and drink at 25% duty on listed products**
- Seaweed - dried, frozen or chilled is still tariff free from the EU as US Harmonized Tariff Chapter 12.1212**
- But roasted or processed seaweed has a 6.4% tariff and EU food and drink products such as whisky and cheese have 25% duty as a punitive countermeasure.**

US Seaweed Tariff

Harmonized Tariff Schedule of the United States (2016)

Annotated for Statistical Reporting Purposes

II
12-12

Heading/ Subheading	Stat. Suf- fix	Article Description	Unit of Quantity	Rates of Duty		
				1		2
				General	Special	
1212		Locust beans, seaweeds and other algae, sugar beet and sugar cane, fresh, chilled, frozen or dried, whether or not ground; fruit stones and kernels and other vegetable products (including unroasted chicory roots of the variety <i>Cichorium intybus sativum</i>) of a kind used primarily for human consumption, not elsewhere specified or included:				
		Seaweeds and other algae:				
1212.21.00	00	Fit for human consumption.....	kg.....	Free		Free
1212.29.00	00	Other.....	kg.....	Free		Free
		Other:				
1212.91.00	00	Sugar beet.....	t.....	39.7¢/t	Free (A+, AU, BH, CA, CL, CO, D, E, II .JO KR MA	88.2¢/t

WTO Ruling in favour of US vs EU 25% Tariff on selected EU food & drink

U.S. Wins \$7.5 Billion Award in Airbus Subsidies Case | United St...

<https://ustr.gov/about-us/policy-offices/press-office/press-releases/...>

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U.S. Wins \$7.5 Billion Award in Airbus Subsidies Case

10/02/2019


Largest Ever WTO Award Paves the Way for U.S. Countermeasures

The End-Result from Shore to Consumers

**Seaweed seasoning sachets and pouches
Meeting agreed Quality and Regulatory Standards**

The Product





mara
SEAWEED
Kombu

Enriching stir-in
taste booster



SHAKE ON SEAWED
FLAVOURS OF SCOTLAND

50g e 1.8oz



US Sales

**Approximately \$500,000 of Mara
Seaweed product imported to the USA
annually since 2016**

US Distribution

Product shipped by air to US.

**Stored in bonded food-safe warehouse on
Long Island, NY.**

**Delivered by truck to Fulfilment Centers in
New Jersey, Texas and California**



Mara Seaweed's product range

- Core range of seaweeds, multiple uses

Retail

POUCHES



Gifting

SHAKER SETS



Food Service

CATERING TUBS & SACHETS



Future Products

SUPERFOOD POWDERS & SNACKS ETC



New Products

SEAWEED BUTTER, SACHET BOXES ETC



B2B

INGREDIENT FOR PRODUCT DEVELOPMENT

Next Steps

**Towards a
North Atlantic Seaweed Alliance**

Next Steps

**Invitation from Mara Seaweed
to the East Neuk of Fife,
Scotland's famous golf coast
for a follow-up
Seaweed Research Workshop**

Acknowledgments

**Thanks to
the Scottish Seaweed Industry Association
&
Norgesvel
for hosting this research workshop**



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