



Seaweed: An Ocean of Opportunities

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What can be seaweed used for?

- ⦿ Fuel
- ⦿ Skincare and cosmetics
- ⦿ Fertiliser
- ⦿ Feed
- ⦿ Food and food ingredients
- ⦿ Life science and medicine

Fuel

- ⦿ Seen as a potential source of ethanol
- ⦿ More efficient than land plants in fixing CO_2
- ⦿ Cleans water from fish farms
- ⦿ Would not use land suitable for other food crops



Skincare and Cosmetics

- ◎ Luxury soaps and skin preparations
- ◎ Made from a range of different seaweeds
- ◎ Thalassotherapy



Feed

- ◎ Seaweed meal fed to boost mineral levels in animal feed
- ◎ Specialist feed for racing camels!
- ◎ Some sheep will eat sea weed from the beach
- ◎ Australian studies show 2% seaweed in the diet of cows can reduce methane emission by up to 99%



Fertiliser

- ◎ Rich in plant nutrients
- ◎ Traditionally harvested and used to fertilise fields
- ◎ Used to produce both solid and liquid fertiliser



Food and Food Ingredients

- ◎ Staple food in Japan
- ◎ Laverbread in Wales
- ◎ Now advocated as a 'Superfood'
- ◎ High in vitamins and minerals
- ◎ Concentrates minerals from surrounding seawater



Food and Food Ingredients

- ⦿ High in fibre – 35-50% of dry weight
- ⦿ Contains range of complex carbohydrates not all digestible by the human gut
- ⦿ Protein level depends on the species – 5-47% dry weight
- ⦿ Low fat content but contains polyunsaturated ω 3 fatty acids



Local seaweed-based businesses

- ◎ Pembrokehire Beach Food – range of products from local seaweed with shop and café



- ◎ Selwyn's Seaweed – laverbread and snacks using nori from the Far East

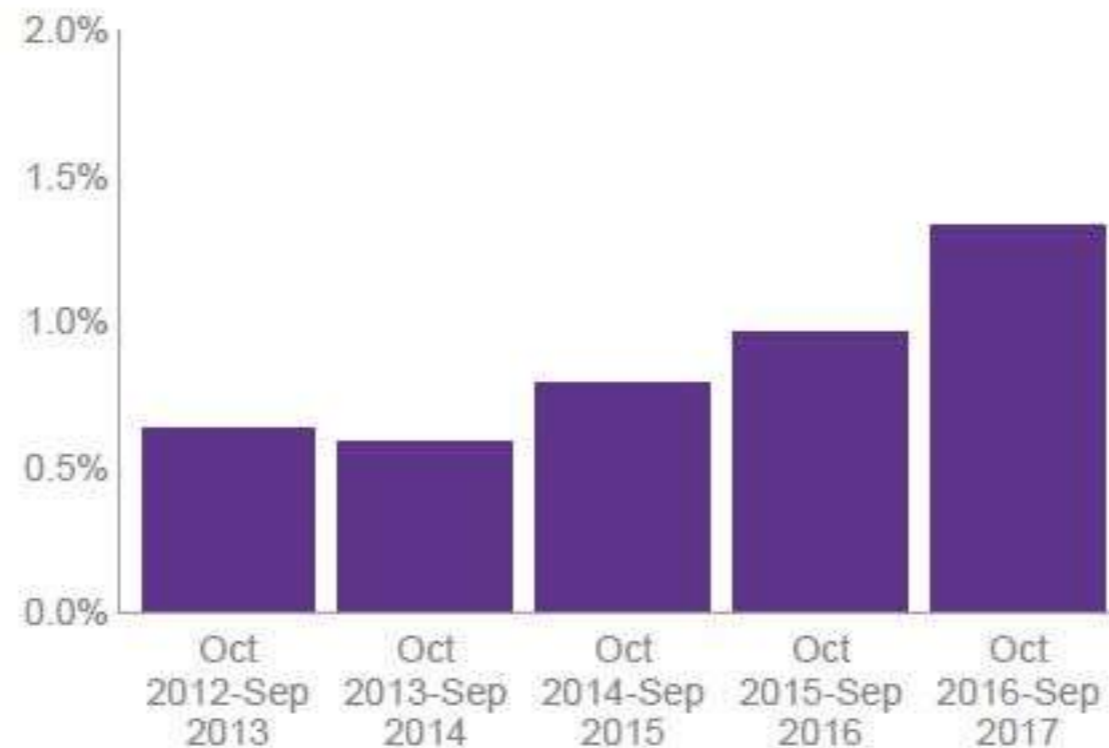
Food and Food Ingredients

- ◎ Three important hydrocolloids – agar, alginate and carrageenan
- ◎ Used as thickeners, gels and stabilisers



Market Interest

Europe: food & drink launches, % featuring algae*, Oct 2010-Sep 2017

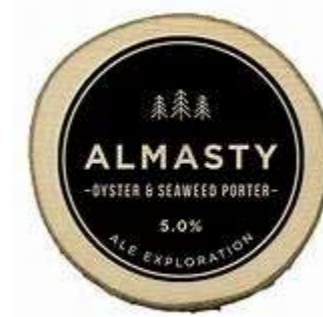


Rapidly growing European market for food products containing seaweed

147% sales growth between 2011 and 2015

Other food opportunities

- ◎ Specialist ales and porters – Kelpie Seaweed Ale, Oyster and Seaweed Porter
- ◎ Specialist gins – Dà Nhile Seaweed Gin
- ◎ ‘Fines’ for clarifying beer using carrageenan
- ◎ Compostable packaging materials



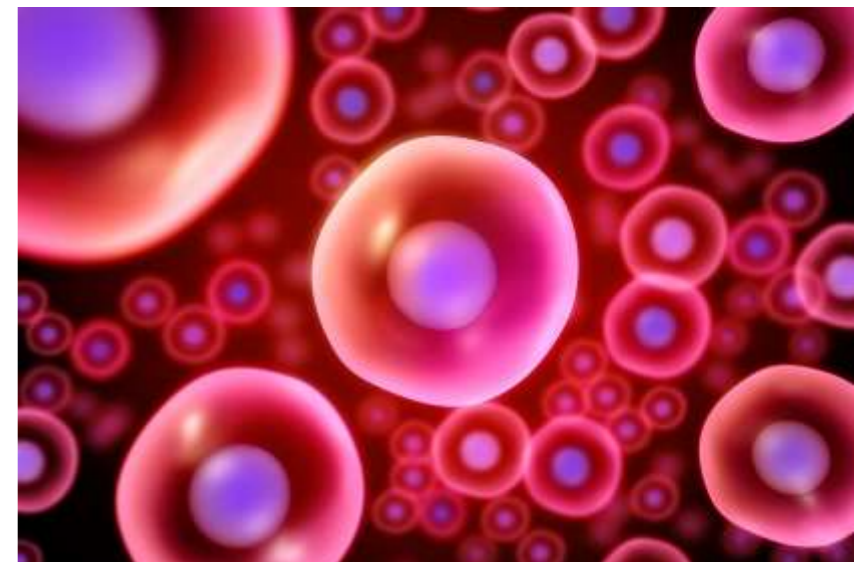
Life Science and Medicine

- ◎ Agar is the traditional solid medium used for microbial growth
- ◎ Seaweed-derived hydrogels used for wound treatments



Life Science and Medicine

- ◎ Hydrogels used for preservation and to provide growth matrices for live cells
- ◎ Fucoidan used in cancer treatment to protect healthy cells

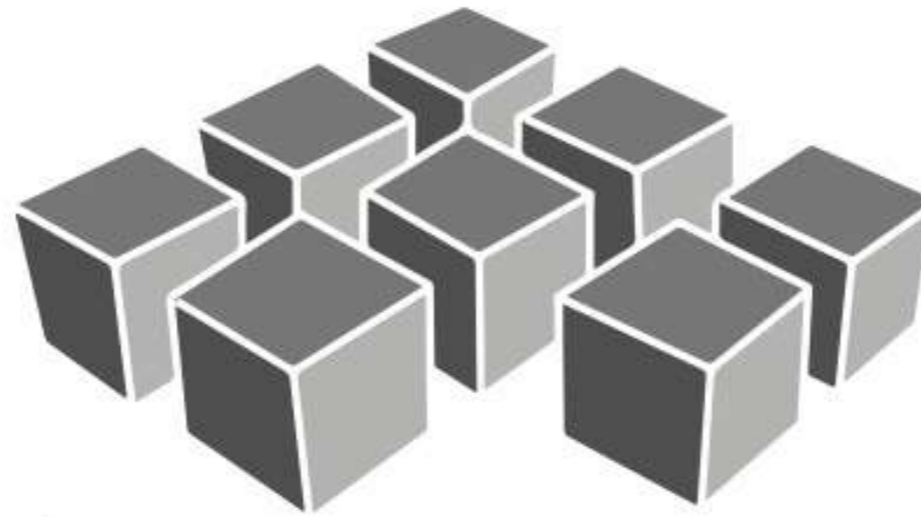


How much seaweed is harvested?

- ◎ Global seaweed production has doubled between 2010 and 2014 from 10.5 to 28.4 million tonnes
- ◎ In 2012 world production estimated to be \$6 billion
- ◎ 95% of production from Asian aquaculture
- ◎ Wild harvest in the UK 2,000 to 3,000 tonnes dry wt (does not include subtidal and storm-cast seaweed)



What next for seaweed business in Wales?



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