



Commercialization

- ◆ Fucoidan dietary supplement, fucoidan gargle, Seaweed Nutridrink, and carrageenan oligomer hand sanitizer technologies transferred to Bodina Naturals Pvt. Ltd. and are available in market
- ◆ Fucoidan production method transferred to Amalgam Foods Pvt. Ltd.



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Nutraceuticals and functional food from **Seaweeds**

ICAR



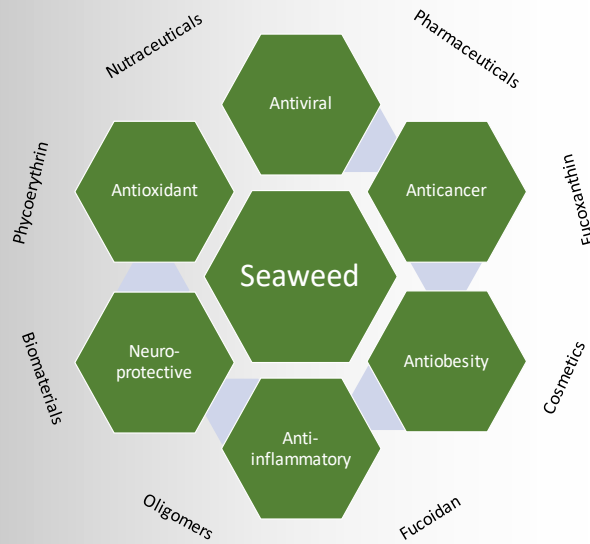
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Seaweeds are marine plants and classified as red, green, and brown seaweed depending on the pigment present. These aquatic plants are rich sources of health promoting biomolecules (lipids, carotenoids, peptides, sulphated carbohydrates, dietary fibres, essential amino acids, vitamins, trace minerals) and these are relatively unexplored. The unique bioactive compounds in seaweeds have immense applications in the field of biomedical, nutraceutical, aquaculture, cosmetics etc. Global seaweed production during 2018 was 32.4 million tons (wet weight basis) with the market value estimation of 13.3 billion USD



CIFTEQ™ Nutraceuticals and functional foods

- ◆ CIFTEQ FucoTeaEx supplement; a microencapsulated formulation of fucoidan and green tea for heart health.
- ◆ CIFTEQ Seaweed Nutridrink; rich in vitamins, minerals, amino acids, taurine.
- ◆ CIFTEQ Fucoidan yogurt; fucoidan enriched yoghurt exhibits good phenolic content and antioxidative potential.
- ◆ CIFTEQ Seaweed cookies; The cookies are rich in protein and dietary fibre content, along with high phenolic content and antioxidative potential.



Bioactivities of seaweed

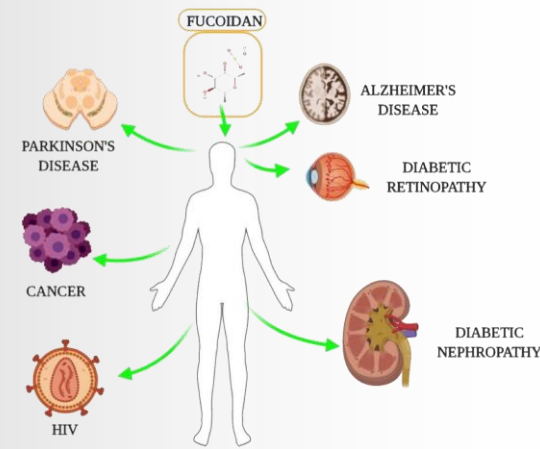
Seaweed hydrocolloids such as agar, carrageenan, and alginates have bulk use in food as thickeners, emulsifiers, gelling agents, etc. Raw seaweeds are also incorporated into food to improve their nutritive value

Promising biomolecules from seaweed

Fucoidan

A natural sulfated polysaccharide extracted from the extracellular matrix of brown seaweed. Fucoidan is made up of sulfate groups, L-fucose, and one or more small proportions of xylose, galactose, mannose, glucose, rhamnose, arabinose, glucuronic acid, and acetyl groups

Reported to have antiviral, anti-tumor, anti-inflammatory, antioxidant, and antibacterial effects



Fucoxanthin

Main carotenoid in marine brown algae. It has a unique molecular structure with allenic bond and oxygenic functional groups. Possess immense biological properties such as antioxidant, anti-obesity, antidiabetic, anti-inflammatory, anticancer, hepato-protective activities as well as cardiovascular and cerebrovascular protective effects which further increased its demand.

The global Fx production was 500 t in 2016 and grew at an annual rate of 5.3% between 2016 and 2021

Carrageenan oligomers

A natural sulphated polysaccharide extracted from red seaweed. Used as emulsifier, biodegradable packaging material, and gelling agent in food. Carrageenan oligomers are reported to possess antiviral, antioxidant, and antimicrobial activity.

