



Article

Precision Nutrition and Health: Foresight Future of Disease Prediction and Prevention

Proceedings of the International Conference on "Precision Nutrition and Health: Foresight Future of Disease Prediction and Prevention", Jointly Organizing by: The Research Centre of Home Science (Human Nutrition and Nutraceuticals), Fatima College, Madurai, Tamil Nadu, India and Department and P. G. Department of Zoology On 20th December 2022.

Issue Editors: Dr. Vasantha Esther Rani; **Dr. K. Karthiga**; Ms. D. Mouna; **Ms. J. Josephine Jesintha**

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20th December 2022*

Special Editors of the Issue

*Dr. Vasantha Esther Rani
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Ms. D. Mouna
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Alginate Extraction from Brown Seaweed (*Sargassum wightii*)

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Abstract

Seaweeds are 'macro algae' which means 'large algae'. They are a group of autotrophic, plant like organisms containing chlorophyll. Rameshwaram, Pamban, Keelakarai and Mandapam areas of South Tamil Nadu coast has rich marine algae vegetation. Edible seaweeds may be considered as easy sources of nutrients such as minerals and trace elements, vitamins and polyphenols due to their availability. Seaweeds are used as human food, animal fodder, chicken (birds) and aqua (fishes) feed, manure and liquid seaweed fertilizer for crops, besides their use as phytochemicals (agar, agarose, alginate and carrageenan). They also serve as medicines and antioxidants. The present study is undertaken to compare the extraction of alginate by two methods. Sea weed species, *Sargassum wightii* (Brown) were collected from the coast of Gulf of Mannar and used to extract the alginate by using hot and cold method. Alginate from the brown seaweed by using hot method yields 17.2%, cold method yields 39.15% of alginate. And phytochemical analysis was done in the extracted alginate. The phytochemical results indicated the absence of alkaloids, phlobaphenins, flavonoids, steroids, terpenoids, cardiac glycosides and phenols. Only carbohydrate as well as sugar derivative of saponins and tannins were found to be present in the alginate.

Key words: Alginate, Extraction, Purity, Phytochemicals

Seaweeds are marine macro algae growing abundantly in the shallow waters of sea, estuaries and backwaters up to a depth of 118 m where 0.1 percent photosynthetic light is available. They are primitive plants that maybe very tiny or large, growing up to 90 m long. Seaweeds are found attached to rocks in the intertidal zone or washed up on the beach and floating on the ocean's surface. Depending upon the photosynthetic pigments present in seaweeds, they are classified into four major divisions such as Chlorophyta (green algae), Phaeophyta (brown algae), Rhodophyta (red algae) and Cyanophyta (blue green algae) [1]. More than 20,000 seaweeds are distributed throughout the world, of which only 221 species (1.1 percent) are commercially utilized. This includes 145 species for food and 110 species for phycocolloid production [2]. The recorded 842 seaweed species from Indian waters comprises of 68 families and 273 genera, which includes 217 Chlorophyta, 191 Phaeophyta and 434 Rhodophyta species [3].

Tamil Nadu was recorded with 104 species of seaweeds comprised of 37 Chlorophyta, 21 Phaeophyta and 44 Rhodophyta [4]. Over the past 50 years, the utilization of algae has increased considerably, with the consequent increase in applied research in various related fields [5]. Seaweeds have been documented to contain many phytochemicals such as antioxidants and microbicide molecules such as polyphenols, proteins, amino acids, sulphated polysaccharides, derived carotenoids such as violaxanthin and fucoxanthin, carrageenans and alginates [6]. Pectins, fucoidan, galactan sulphate,

xylomannan sulphate, and porphyran are some bioactive polysaccharides from seaweed [7].

The nutritional value of seaweeds is really profound and they are used as human food in different countries. Presently, there are 42 countries in the world that exploits seaweeds commercially. Among them, China holds first rank followed by North Korea, Japan, Philippines, Chile, Norway, Indonesia, USA and India. These top ten countries contribute up to 95% of the world's commercial seaweed utilization [8].

Nowadays, Marine plant resources are attracting more and more attention as a raw material for the production of phytochemicals such as Alginic acid, agar-agar, carrageenan, iodine and the like, which are widely used in several industries involved in the manufacture of certain food materials, fertilizers and pharmaceuticals. Brown algae are a promising object in the food industry and prophylactic and clinical medicine. The word alginate is a generic term, meaning the various derivatives of alginic acid that either occur naturally in certain brown seaweeds (alginothymus), are produced from the natural derivatives.

Alginate is a linear polyanion of (1,4)-linked α-L-galacturonic (G) and β-D-mannuronic (M) residues arranged in a non-regular block wise pattern along the chain. The actual chemical structure of the alginate varies between genera, and a similar variability is found in the properties of the alginate that is extracted from the seaweed. The molecular weight of alginate ranges generally between 500 and 1,000 kDa. Its solubility is