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Phytochemical Analysis of *Scinaia bengalica* by GC-MS

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Abstract : Marine red algae consist of various medicinal activities. Marine sources are more active than the other natural sources. One of the most important red algae is S*cinaia Bengalica(SB)*known for its phytochemical analysis by GC-MS revealed 19 chemical constituents. SB consist major constituents like oleic acid, octanoic acid, 2 hexyl-1-octanol,hexadecanol, calcitriol, bromine compounds.
Key Words : S*cinaia bengalica,* GC-MS, calcitriol, Marine sources, phytochemical. bromine, hexadecanol.

Introduction:

Approximately 6000 species of algae present marine,most red algae are marine origin; only a few occur in freshwater. Rhodophytes are usually multicellular and grow attached to rocks or other algae, but there are some unicellular or colonial forms. Marine algae are the rich sources of structurally active and biologically active compounds[1]. Marine red algae consist of rich antioxidants, anticancer, antimicrobial, anti inflammatory and antidiabetic activity[2]. Microalgae protein and lipoprotein found to have antibacterial, antifungal, antiviral acivity[3].

Sea weeds are consists of reactive antioxidant compounds such asascorbate and glutathione(GSH), secondary metabolites including carotenoids (alpha and beta carotenoids), aminoacids, phlorotannins (phloroglucinol), tocopherols(alpha and beta tocopherols)[4].Marine algae and weeds consist of large amount of minerals and trace elements taken from the marine water and convert them in useful organic forms as they grow in a mineral rich medium[5],Marine algae are good source of unsaponifiablenon toxic steroids and other secondary metabolites[6].They selectively absorb sodium, Potassium, Magnesium, Iodine and Bromine elements and accumulate them in its thalli. As the alkali composition sea foods prevents the blood acidosis. The marine algae consist of antibacterial and antimicrobial activity against all the tested bacteria showing maximum activity against *Bacillus subtilis*[7]. The hot water extracts of marine brown algae consists of antiviral activity due to the presence of heteropolysaccharides[8]

Seaweeds have been used as natural materials from which to extract bioactive substances over the past 20 years because of their widespread distribution and large biomass. They are usually collected for food consumption and especially known for their high nutritional value and health benefits. Marine green algae remain unexploited among the three main divisions of macroalgae (*i.e.*, Chlorophyta, Phaeophyta, and Rhodophyta). But it has been recently taken up because of their many active ingredients, particularly those that

used for medical purposes. However, many different mechanisms of action have been proposed but the structure of the active compounds was usually not elucidated. Recently, it has been carried out using purified fractions.

Marine green algae of some species have high anticoagulant activity. Among them *Codifragile*(Oyster thief), have vital functions for human health and nutrition[9]. Recent studies have also reported that it has antioxidant, antiviral, anti cancer activities and mainly using as remedies for inflammation-related symptoms, anticoagulant and platelet disaggregation properties, and lack of toxicity make it a potential agent for thrombolytic therapy. It provides different bioactive compounds of great chemical diversity and different structural units with distinct bioactivities from various places in different seasons.

Scinaia Bengalica(SB) belongs to the red algae, Rhodophyta phylum, Scinaiaceae family, Scinaia Genus, Scinaia bengalica species. Availability of SB: Madras Beach, India. Detailed distribution as *Scinaia bengalica* Børgesen: *Africa*: South Africa. Red algae Rhodophyceae. *South-west Asia*: India[10,11,12,13]

CitingAlgaeBase

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Materials and Methods:

Collection and Extraction of algae:

Scinaia Bengalica was collected from the Madras Beach region, located on the Madras coastal region, Tamil Nadu, India. Cleaned marine algae were shade dried, the completely dried algae was used for further GC-MS phytoconstituent determination.The completely dried material was weighed and grind coarsely in a mechanical grinder. In the present study we evaluate the biological potencies of marine red algae.

Preparation of Ethanol Extract of SB for GC-MS Analysis:

SB was shade dried and 2g of the powdered biomass was soaked in 95% ethanol for 12hrs. Then the extract was filtered through whatman No.41 filter paper along with 0.2g of sodium sulfate to remove the sediments and traces of water in the filtrate. Before filtering, the filter paper was moistened with 95% ethanol for 12hrs. An aliquot of 2µl of this solution was employed for GC-MS analysis[15].

GC-MS Analysis:

GC-MS analysis was carried out on a GC Clarus 500 Perkin Elmer system comprising of Aoc-20i auto sampler and gas chromatograph interfaced to a mass spectrometer. GC-MS instrument employed the following conditions: column-Elite-1 fused silica capillary column (30 mm x 0.25 mm ID x1 µMdf), composed of 100% dimethyl poly siloxane, operating in electron impact mode at 70eV; carrier gas-helium (99.999%) at a constant flow of 1 ml/min; injection volume-0.5 µl (split ratio of 10:1); injector temperature- 250°C and an ion source temperature of 280°C. The oven temperature was programmed from 110°C (isothermal for 2 min) with an increase of 0°C/min to 200°C, then 5°C/min to 280°C ending with a 9 min isothermal at 280°C. Mass spectra were taken at 70 eV; a scan interval of 0.5 seconds and fragments from 45 to 450 Da. Total GC running time was 36 min.

Results

GC-MS Profile of Ethanol Extract of *Scinaia Bengalica*

A high resolution mass spectrum equippedwith a data system in combination with GasChromatography was used for the chemical analysis ofactive red seaweed. The crude ethanolic extract of *SB* based on spectral data by GC-MS analysiswas found to be a mixture of volatile compounds. 19 peakswere observed with retention times as presented in Table-1.

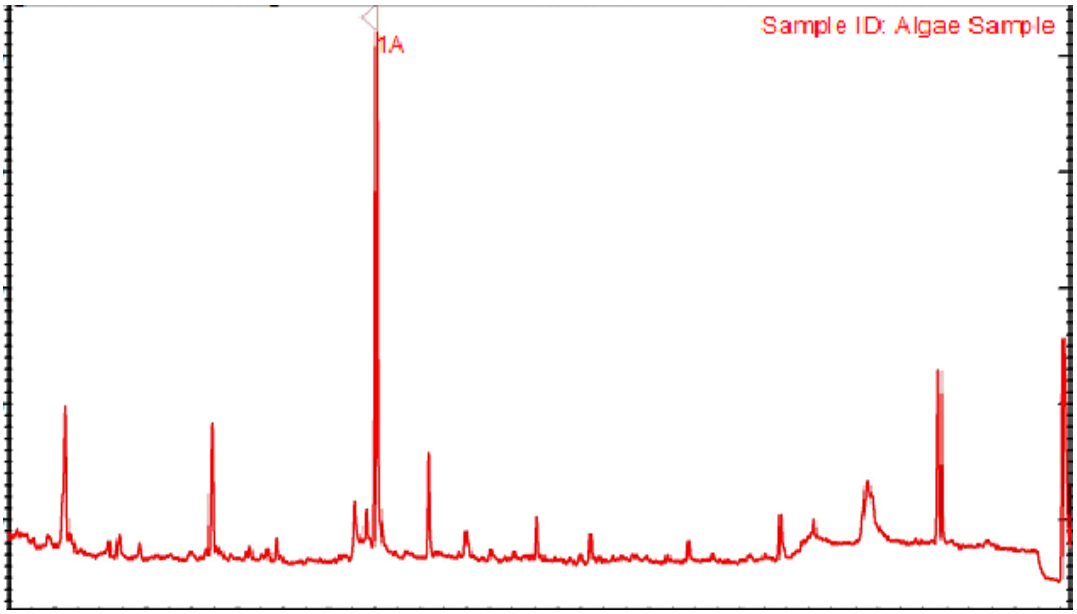

Figure 1: The Phytochemical peaks obtained by Gas Chromatography Mass Spectroscopy.

Table 1 - Phytochemicals obtained from GCMS with its retention time and peak area % of SB.

S.No	Retention Time	Name of the Compounds	Peak Area %
1	5.319	1,2-Dihydropyrazol-3-one, 4-(4-bromomethyl-4,	8.592
2	5.813	9, 12 octadecadienoic acid	1.408
3	7.398	8-Pentadecanone	0.582
4	8.802	Octadecane 6-methyl	0.728
5	10.252	Hexadecanol	6.675
6	10.520	9, 12, 15-Octa decatrienoic acid	0.435
7	10.724	n-Hexadecanoic acid	2.582
8	10.997	E-11-Hexadecenoic acid, ethyl ester	2.736
9	12.135	Eicosanoic acid	28.220
10	12.956	Methyl 3-methyl-pentadecanoate	4.519
11	14.228	Z,E-2,13-Octadecadien-1-ol	0.782
12	14.500	3Trifluoroacetoxypentadecane	1.865
13	15.415	10-Bromodecanoic acid, ethyl ester	1.743
14	15.676	7-Heptadecene, 17-chloro-	1.622
15	17.814	1-Hexacosene	0.923
16	19.825	Octadecanal, 2-bromo-	4.087
17	20.565	16-Hentriacontanone	4.440
18	21.745	Calcitriol	11.339
19	23.285	Adenosine 3 Phosphoric acid	12.867

The GC-MS analysis of ethanol extract of SB revealed phytoconstituent of 1,2-Dihydropyrazol-3-one, 4-(4-bromomethyl-4, 9, 12 octadecadienoic acid, 8-Pentadecanone, Octadecane 6-methyl, Hexadecanol, 9, 12, 15-Octa decatrienoic acid, n-Hexadecanoic acid, E-11-Hexadecenoic acid, ethyl ester, Eicosanoic acid, Methyl3-methyl-pentadecanoate, Z,E-2,13-Octadecadien-1-ol, 3Trifluoroacetoxypentadecane, 10-Bromo

decanoic acid, ethyl ester, 7-Heptadecene, 17-chloro, 1-Hexacosene, Octadecanal, 2-bromo, 16-Hentriacontanone, Calcitriol, Adenosine 3 Phosphoric acid.

Discussion:

Globally diabetes cases have exploded in the past two decades at 6% per annum and by the year 2025. 324 million people will be diabetic[16]. Natural sources of drugs from marine algae are used widely, even when their biologically active compounds are unknown, because of their effectiveness, minimal side effects in clinical experience and relatively low cost. They are one of the less explored sources of pharmacological candidates and few previous studies have found antidiabetic activities in various marine algae[17]. Marine algae inhibit the alpha-glucosidase and alpha-amylase in a uncompetitive and non-competitive manner[18].

Conclusion

In this study, marine macroalgae have been isolated and the preliminary phytochemical analysis was done. The preliminary phytochemical analysis revealed the presence of hexadecanoic acid, eicosanoic acid, calcitriol, Bromodecanoic acid, Adenosine 3 Phosphoric acid. The *Scinaia Bengalica* consist of various phytoconstituents that could be used as medicines after the complete research done for the identification of medicinal properties.

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