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PHYTOCHEMICAL AND ENZYME CHARACTERIZATION OF SARGASSUM WIGHTII FROM MANDAPAM REGION, TAMIL NADU, INDIA

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ABSTRACT

In this present study is focus on the phytochemicals and enzyme concentration of brown seaweed as Phaeophyceaesargassum wightii were collected from mandapam coast region, Tamilnadu, India.The preliminary tests were done by standard methods. The sargassum wightii showed that highest value of alkaloids, carbohydrates, saponins ,tannins, pseudotannins, chlorogenic acids, flovanoids, phenols and enzymes like catalase,peroxidase and super oxide dismutase by different solvents like benzene, chloroform and water. The result of the present study confirmed that Sargassum wightii may be rich sources of phytonutrients and enzymes. Further work will emphasize the isolation and characterization of highly bio active compounds are responsible for bio efficacy and bioactivity.

KEY WORDS: sargassum wightii, phytochemicals, enzymes, bio active compounds.

INTRODUCTION

Marines floras include micro flora like bacteria, actinobactera, cyanobacteria and fungi, microalgae, macroalgae like seaweeds and flowering plants like mangroves and other halophytes(1).Ocean is more than 71 % of globe rich in biodiversity and this 90 % is micro algae and macro algae total oceanic mass(2-5).Macro algae or sea weeds are excellent sources of proteins, iodine, minerals, vitamins and some important bio active compounds [6-8].

The most marine floral resources will give immense scope for discovery of new chemical entities for the beneficial to the human being. It is increasing recognition that this oceanic mass contains a huge number of natural products and new chemical findings with unique biological activities that may be useful in discover the new potential drugs with greater efficacy to cure the human diseases (4).The marine sources gives novel chemicals to do their extreme variations in the way of pressure, salinity, temperature and so forth, and these chemicals are unique in diversity, structural and functional features(9-11).

These above secondary metabolites and involve such well known chemical Groups an alkaloids, terpenoids, peptides, sugars, steroids and polysaccharides and other metabolites. Some of these marine compounds shows potentially pharmacological activities and helpful for the invention and discovery of potentially bioactive compounds it is used for deadly diseases like antioxiatants, cancer and metastasis in this society.Free radicals are highly important chemical species with highly unpaired charged particles.These are includes highly oxygen and oxygen free radicals.They called as reactive oxygen species (ROS).If it has charged particles it can accept or donate electrons from molecules,these process is known as oxidation and these chemical known as oxidants or free radicals.

Free radicals are damage the cellular proteins it causes breakdown of DNA strands and initiate the peroxidation of various compounds. These kind of damage increases the aging process and many disease like cancer, atherosclerosis and hepatic injuries. In addition to their technological properties. Seaweeds exhibit original and interesting nutritional properties also. From these nutritional properties the main activity of seaweeds are their highest minerals and soluble dietary fibre contents. The nutritional value of marine algae seaweeds can be an under exploited sources of health benefit molecules for food processing and neutraceuticals industry.

As the above fact these are need for isolation and characterization of natural antioxidant having less or no side effects. Hence foods and medicinal compounds to replace the synthetic antioxidants(12-13). These present study was undertaken to evaluate the antioxidant activity of phytochemicals and enzymes from sargassum wightii in their antioxidant properties.

MATERIALS AND METHODS

Collection and isolation of samples

Sargassum wightii collected from the Gulf of Mannar region of Mandapam coast (Lat 09° 17`N, Long 79° 07`E), Tamilnadu, south-east coast of India. The collected sea weed sargassum wightii were initially washed with sea water to remove the macroscopic epiphytes, sand particles and other extraneous matter and then rinsed in distilled water(14). This was then air dried in shady place and ground to fine powder which was used for further analysis.

Preparation of Extract

20 gm powdered sargassum wightii were soaked in 50 ml of methanol over the 48 hours and then filtered by what mann filter paper No 1 along with 2 gm sodium sulfate to remove the sediments and traces of water in the filtrate. Then the filtrate is concentrated to 1 ml by bubbling nitrogen gas into the solution(15).

Phytochemical analysis

All the extracts of powder of plant sample were subjected to qualitative test for the identification of various plant constituents by standard methods.

S. No.	Name of the Test	Phytochemical Constituents	Benzene	Chloroform	Aqueous
1	Mayer's test Dragendroff's test Wagner Test	Alkaloids	+ + -	+ + -	+ + -
2	Molish Test Fehling Test Benedicts Test	Carbohydrates	- - -	- - -	+ - -
3	Foam Test	Saponins	+	+	-
4	Lead Acetate	Tannins	-	-	+
5	Ferric chloride.	Pseudo tannins	-	-	+
6	Ammonia	Chlorogenic acid	+	+	-
7	NaOH	Anthocyanin	-	-	-
8	Liebermann's Burchard Test	Steroidal Glycosides	-	-	-
9	H_2So_4	Saponins glycosides	+	+	-
10	Ammonia	Flavonoids	+	-	-
11	Shinoda's Test	Flavones	-	-	-
12	Sodium chloride	Coumarin	-	-	-
13	Phenol reagent	Phenol	+	+	+
14	Salkowaski	Steroidal Glycosides	-	-	+

Enzyme activity

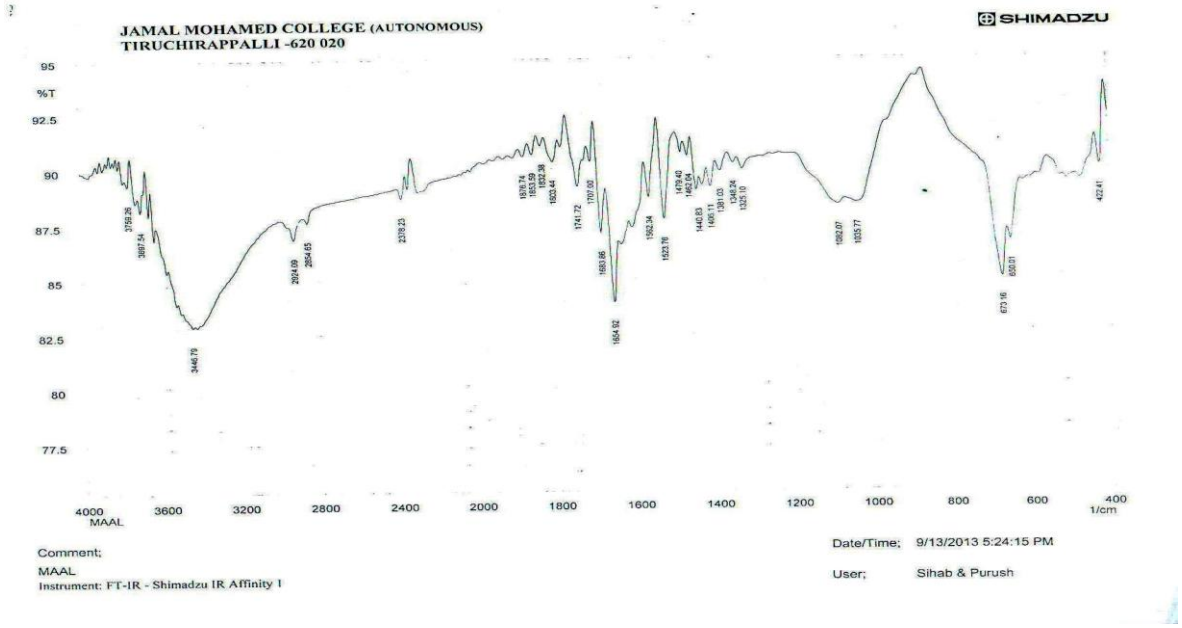
The assay of SOD,catalase and peroxidase were estimated by standard methods.

S. No	Name of the Test	0.2 (ml)	0.4 (ml)	0.6 (ml)	0.8 (ml)	1.0 (ml)
1.	Peroxidase	4.74±0.65	18.1±1.13	33.3± 0.21	41.8± 0.07	44.9± 0.28
2.	Catalyse	10.7± 0.07	13.3±0.14	18.3±0.77	20.1±0.07	24.5±0.07
3.	SOD	14.7±0.07	16.3±0.14	19.9±0.21	25.2±0.14	29.4±0.21

Results (Results in %)

FTIR analysis

FT IR analysis was performed with lyophilized methanolic seaweed extracts.The molecular functional vibrations of chemical functions present in the sample was identified by Sihab and Purush FT IR-Shimadzu IR affinity 1 operated at ranging from 4000 to 400 cm^{-1}.



RESULTS AND DISCUSSION

The methanolic extracts of sargassum wightii was obtained in yellowish green.To identify the molecular functional groups by FTIR.Earlier studies on sargassum wightii revealed the presence of biologically active compounds like amino acids, carbohydrates, tannins,

alkaloids, flavonoids and phenolic compounds. Major FTIR peaks at 3446 cm^{-1},it indicates the presence of phenolic compounds with free O-H group which is usually broad group. Further a peak at 1654 cm^{-1}, it indicates alkenes. These above biologically active compounds were qualitatively measured by standard methods. Bio active compounds like alkaloids and phenolic compounds were exhibited in benzene, chloroform and aqueous solvents. Saponins was elevated in benzene and chloroform alone. Carbohydrate and tannins were exhibited in aqueous solvent only further more flavonoids was identified by benzene solvent remining absence. Coumarin and flavones were not exhibited from thes three solvents but these may be elevated other solvents.

Enzymatic analysis revealed the presence of antioxidant properties in the methanolic extracts of sargassum wightii. The estimation of antioxidant enzymes like peroxidase,catalase and super oxide dismutase (SOD) was done by standard methods. These enzymes are presented in the sargassum wightii quantitatively like peroxidase > SOD >catalase.These reveals the presence of antioxidant enzymes are present in the methanolic extracts of sargassum wightii and it requires further detailed investigation.

CONCLUSION

The phenolic compounds such as phenol tannin and flavonoids are identified maximum amount in red and brown seaweeds. They are being studied to find out whether they can prevent chronic diseases like heart disease and cancer.Harmful molecules known as free radicals which can damage the DNA in cellular level and may trigger diseases like cancer,heart diseases and biological dysfunctions also.Phytochemicals and enzymes like peroxidase, catalase and SOD are act as antioxidant against free radicals may protect the cellular functional activity. Further study will emphasize the isolation and characterization of active compounds in the sargassum wightii responsible for the bio efficacy and bio activity in different functions.

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