Quest Journals
Journal of Research in Agriculture and Animal Science
Volume 9 ~ Issue 5 (2022) pp: 25-32
ISSN(Online) : 2321-9459
www.questjournals.org

Research Paper

Comparative Analysis of Phytochemical Profile and Antioxidant Activity of *Valoniopsis pachynema* (G.Martens) Børgesen AND *Stoechospermum marginatum* (C.Agardh) Kützi

[1]DR CHITRA G,[2] SREEKUTTY P P
Department of Botany,Sree Narayana College,Nattika,Thrissur,Kerala,India

ABSTRACT: *The present study provides useful information of all the phytochemicals such as alkaloids, steroids, flavonoids, phenols, coumarins, cardiac glycosides, tannins, terpinoids and saponins and total phenol and flavonoid content and mainly concentrated on their DPPH free radical scavenging activity present in both of the algae, Valoniopsis pachynema and Stoechospermum marginatum from Thikkodi coast.*
KEYWORDS: *Phytochemical,DPPH,Valoniopsis pachynema,Stoechospermum marginatum*

R*eceived 03 May, 2022;* ***R****evised 14 May, 2022;* ***A****ccepted 16 May, 2022 © The author(s) 2022.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

Marine environment is also composed of both flora and fauna. Seaweeds are mainly found in the intertidal zone and also in tropical waters of the Ocean. The plant body of macro algae describe d as thallus, is not differentiated in to root, stem and leaf [1]. Based on the photosynthetic pigments present in them, they are classified into three groups, viz., Chlorophyceae (Green algae), Phaeophyceae (Brown algae) and Rhodophyceae (Red algae) [2]. Seaweeds as renewable resources, are the main source of dietary fibres, minerals, vitamins, polysaccharides, fatty acids and a range of phenolic components [3]. Non-primary or secondary metabolites in macro algae are called phytochemicals. Phytochemicals help in maintaining homeostasis a condition within the body during stress condition. Almost all seaweeds possess flavonoids, terpenes, alkaloids, glucosinolate, saponins, phenols etc. Phenolic compounds have the ability to act as antioxidant agents by chelating metal ions and preventing free radical formation[4]. Phenolic compounds also possess a wide range of biological effects like antioxidant, antimicrobial, anti-inflammatory and vasodilatory actions[5]. Antioxidants are also used in medicine, food, pharmaceutical and cosmetic industry [6]. Hence, the present study has been focused to explore and compare the phytochemicals and antioxidants in seaweeds, *Valoniopsis pachynema* (G.Martens) Børgesen and *Stoechospermum marginatum* (C.Agardh) Kützing collected from Thikkodi coast, Kerala.

II. MATERIALS AND METHODS

Study area

The algal samples were collected from Thikkodi (11°29 N lat & 75°37 E long) during December 2020. The station has an extensive rocky promontory with small bay of sand and posses very rich algal vegetation. There is no fresh water influence.

Collection of seaweed

Valoniopsis pachynema is a filamentous green algae (Chlorophyceae). The algae appears like a stiff spongy mats of tangled branched filaments on dead corals, inter tidal rocks or hard substrate and they attached by rhizoids. *Stoechospermum marginatum* consist of erect, racemes, repeatedly dichotomously branched yellowish-brown, 4.1-28 cm in height and attached to substratum by means of fibrous holdfast. It found in rocky pools in lower part of the littoral zones, open sea and also cast ashore. The fresh macro algae sample material of two species namely *Valoniopsis pachynema* (G.Martens) Børgesen (Chlorophyceae) and *Stoechospermum*

marginatum (C.Agardh) Kützing (Phaeophyceae) were collected from Thikkodi Beach . To remove the adhered sand particles on the samples, were washed with sea water immediately and then brought in to plastic bags to the laboratory. The samples were washed thoroughly with tap water to remove the adhered dirt particles and carefully remove the attached epiphytes. Again it was washed for four to five times to remove the entire debris and sand particles.

Preparation of seaweed powder

Water was drained off from the samples and then spread on blotting paper to remove excess water. Samples were dried at room temperature and in hot air oven at 40°C for two days and they were powdered and kept in air tight plastic bottles at room temperature.

Preparation of solvent extracts

5gm dried crushed samples were extracted each using 100ml, solvents of water, acetone, chloroform and ethyl acetate. The quantity of plant parts were then homogenized in different solvents and then properly covered with Aluminium foil and labelled. Each extract was filtered through Whatsman's filter paper No.1 separately. The extract was evaporated to dryness at 40°C on a dry heat incubator; extract was then kept in the refrigerator until the time of use for following experiment. Afterwards a measured volume of solvent was used to dissolve the extract to required working concentrations.

Qualitative phytochemical screening

Phytochemical screening was carried out by using standard procedure [7].

Total phenolic content

The amount of total phenol in the extract was determined with Folin-Ciocalteu reagent according to the method [8].

Total flavonoid content

Calorimetric technique was used for flavonoid estimation [9].

Antioxidant assay

DDPH radical scavenging assay

Scavenging effects of samples for DDPH radical were monitored according to the method [10].

III. RESULTS

Phytochemical analysis of *Valoniopsis pachynema*

Phytochemical analysis of various extracts of *Valoniopsis pachynema* is conducted and it is determined that tannins are very abundant in all the four extract except chloroform extract. Coumarins and cardiac glycosides are very much abundant in ethyl acetate extract. Flavonoids very much abundant in acetone chloroform and ethyl acetate extract. But phenol show very much abundance in acetone, ethyl alcohol and ethyl acetate. Steroids and terpinoids are totally absent in distilled water extract, but saponins show more abundance. Alkaloids, flavonoids, phenols show their presence in distilled water extract show presence of steroids but alkaloids are totally absent.Saponins show it's higher abundance in acetone extract. Steroids and terpinoids are very much abundant in chloroform extract, but alkaloid, cardiac glycosides, tannins and saponins are totally absent. In chloroform extract phenols show abundance but coumarins presents only in few amounts. Steroids, flavonoids and cardiac glycosides are present in ethyl alcohol extract but alkaloids, coumarins and terpinoids are abundant. And it is noticed that saponins are more abundant in ethyl alcohol extract but totally absent in ethyl acetate extract. Ethyl acetate extract of *Valoniopsis pachynema* show higher abundance of terpinoids but alkaloids and steroids are absent. The maximum abundance of phytochemicals in *Valoniopsis pachynema* , showed by acetone extract. But results are very poor in distilled water extract. (Table-1).

Phytochemical analysis of *Stoechospermum marginatum*

Phytochemical analysis of various extracts of *Stoechospermum marginatum* is conducted. Here acetone extract of algae show very much abundance of phytochemicals except alkaloid, it is noticed that there is only a presence of alkaloid. Ethyl acetate extract is abundant with steroids but other phytochemicals like flavonoids, phenol, coumarins ,cardiac glycosides, tannins and terpinoids are show very much abundance. Alkaloids are totally absent in chloroform and ethyl acetate extract. But ethyl alcohol extract show very much abundance of alkaloid, saponin is absent in ethyl acetate extract. Distilled water extract reported the maximum abundance of coumarins, cardiac glycosides, tannins and saponins , but terpenoid is only absent in distilled water extract but it has maximum abundance in all the other extract. Alkaloid, steroids, flavonoids and phenols are present in distilled water extract. It is noticed that steroids and flavonoids show less abundance of phenol, coumarin and saponin in chloroform extract. Cardiac glycosides are only absent in chloroform extract but maximum abundance in ethyl alcohol extract. There is a maximum abundance of steroid, phenol and saponin and also there

is less abundance of flavonoids and cardiac glycosides in ethyl alcohol extract. Coumarin is also present in ethyl alcohol extract. Acetone extract of *Stoechospermum marginatum* show maximum result for phytochemicals. (Table- 1).

Solvents		Distilled water		Acetone		Chloroform		Ethyl alcohol		Ethyl acetate	
Seaweed		VP	SM	VP	SM	VP	SM	VP	SM	VP	SM
Phytochemicals	Alkaloids	+	+	-	+	-	-	++	+++	-	-
	Steroids	-	+	+	+++	+++	+++	+	+++	-	++
	Flavonoid	+	+	+++	+++	+++	+++	+	++	+++	+++
	Phenols	+	+	+++	+++	++	++	+++	+++	+++	+++
	Coumarins	+++	+++	+++	+++	+	++	++	+	+++	+++
	Cardiac glycerides	+++	+++	+++	+++	-	-	+	++	+++	+++
	Tannins	+++	+++	+++	+++	-	+	+++	+++	+++	+++
	Terpenoids	-	-	++	+++	+++	+++	++	+++	+++	+++
	Saponin	+++	+++	+++	+++	-	++	+++	+++	-	-

(+) Present, (++) Abundant, (+++) Very abundant, (-) Absent VP-*Valoniopsis pachynema* SM-*Stoechospermum marginatum*

Table 1. Qualitative phytochemical analysis of various extracts of *Valoniopsis pachynema* and *Stoechospermum marginatum*

Phenol and flavonoid content in *Valoniopsis pachynema*

Valoniopsis pachynema shows a maximum phenolic content in acetone extract (8.65 ± 0.07 mg/g) and least in chloroform extract (2.63 ± 0.12 mg/g). Ethyl acetate extract also have higher phenolic content (7.86 ± 0.11 mg/g). High flavonoid content is reported in acetone extract (17.66 ± 0.12 mg/g) and less in chloroform extract (10.69 ± 0.15mg/g). (Table- 2).

Phenol and flavonoid content in *Stoechospermum marginatum*

In *Stoechospermum marginatum*, high phenol content is reported in acetone extract (9.7 ± 0.10 mg/g) and low in chloroform extract (5.62 ± 0.15 mg/g). Here also ethyl acetate extract also show more phenol content (8.76 ± 0.09 mg/g). It show high flavonoid content in acetone extract (19.55 ± 0.13 mg/g) and ethyl acetate extract has nearly high flavonoid content (18.42 ± 0.15 mg/g). But less flavonoid content obtained in chloroform extract (13.64 ± 0.12 mg/g . (Table- 2).

Algae	Solvent	Phenol (mg/g)	Flavonoid (mg/g)
Valoniopsis pachynema	Distilled water	3.55±0.10	12.5±60.10
	Acetone	8.65±0.07	17.66±0.12
	Chloroform	2.63±0.12	10.69±0.15
	Ethyl alcohol	5.63±0.12	13.69±0.10
	Ethyl alcohol	7.86±0.11	15.68±0.09
Stoechospermum marginatum	Distilled water	6.68±0.14	15.65±0.08
	Acetone	9.7±0.10	19.55±0.13
	Chloroform	5.62±0.15	13.64±0.12
	Ethyl alcohol	7.79±0.16	17.74±0.11
	Ethyl alcohol	8.76±0.09	18.42±0.15

Table- 2. Total phenol and flavonoid content of various extracts of *Valoniopsis pachynema* and *Stoechospermum marginatum*

DPPH free radical scavenging activity of various extracts of *Valoniopsis pachynema* and *Stoechospermum marginatum*

DPPH free radical scavenging activity of distilled water extract of *Valoniopsis pachynema* was higher at the concentration 500 µg/ml (30.66± 0.14%). The least activity in 100 µg/ml (20.65±0.13%), (Table- 3). In *Stoechospermum marginatum*, higher activity shown in 500 µg/ml (39.65± 0.14%) and least in 100 µg/ml (29.74±0.13%), (Table- 3).DPPH free radical scavenging activity of acetone extract of *Valoniopsis pachynema* noticed a higher value at 500 µg/ml (39.26±0.13%) and lower at 100 µg/ml (30.25±0.12%), (Table- 4). In *Stoechospermum marginatum*, higher activity shown by 500 µg/ml (44.84±0.07%) and less activity in 100 µg/ml (36.54±0.10%), (Table- 4).DPPH free radical scavenging activity of chloroform extract of *Valoniopsis pachynema* reported a higher activity in 500 µg/ml (29.83± 0.09%) and lest at 100 µg/ml (19.76±0.08%), (Table- 5). In *stoechospermum marginatum*, higher activity detected in 500 µg/ml (37.64±0.12%) and less activity at 100 µg/ml (27.47±0.07%), (Table- 5). DPPH free radical scavenging activity of ethyl alcohol extract of *Valoniopsis pachynema* found a higher activity in500 µg/ml (31.75±0.12%) and less activity in 100 µg/ml(22.36±0.09%), (Table- 6). In *Stoechospermum marginatum*, higher activity showed in 500 µg/ml (40.45 ±0.10%), and lower activity at 100 µg/ml (30.36±0.14%), (Table- 6).DPPH free radical scavenging activity of ethyl acetate extract of *Valoniopsis pachynema* exhibit a higher activity in 500 µg/ml (35.56±014%), and least activity at 100 µg/ml(25.66±0.08%), (Table- 7). In *Stoechospermum marginatum*, higher activity observed in 500 µg/ml (42.76±0.12%) and less activity at 100 µg/ml (32.85±0.09%), (Table- 7). In *Valoniopsis pachynema*, a linear connection was found between solvent concentration and DPPH inhibition, with correlation values of (0.994,0.989,0.982,0.955,0.997) and significance at the 0.0002,0.0005,0.0010,0.0041 and 7.95 E-05 levels. *Stoechospermum marginatum* has correlation values of (0.922,0.997,0.989,0.951,0.983) for DW-SM,A-SM,C-SM,EAL-SM,EAC-SM, and is significant at the 0.0094,8.92E-05,0.004,0.0047, and 0.0009 levels..As a result, the rectilinear regression coefficient equations were DW-VP($y=0.025x+18.41$,$R^2=0.9935$),A-VP($y=0.022x+28.52$,$R^2=0.9885$),C-VP($y=0.0243x+17.962$,$R^2=0.9823$),EAL-VP($y=0.0232x+19.232$,$R^2=0.9549$),EAC-VP($y=0.0242x+23.38$,$R^2=0.9967$,DWSM($y=0.0227x+28.754$,$R^2=0.9223$),A-SM($y=0.0204x+34.519$,$R^2=0.9965$),C-SM($y=0.0252x+25.362$,$R^2=0.9892$),EAL-SM($y=0.0259x+28.194R^2=0.9507$), EAC-SM($y=0.0259x+30.411$ $R^2=0.9832$) for each.(Table-8).

No	Concentration (µg/ml)	% of activity (±S.D)		
		Standard (Ascorbic Acid)	*Valoniopsis pachynema*	*Stoechospermum marginatum*
1	100	65.67±0.13	20.65±0.13	29.74±0.13
2	200	82.73±0.13	23.76±0.11	34.58±0.10
3	300	92.65±0.15	25.77±0.08	36.37±0.11
4	400	95.35±0.13	28.78±0.12	37.42±0.21
5	500	96.74±0.08	30.66±0.14	39.65±0.14

Table- 3. DPPH free radical scavenging activity of distilled water seaweed

No	Concentration (µg/ml)	% of activity (±S.D)		
		Standard (Ascorbic acid)	*Valoniopsis pachynema*	*Stoechospermum marginatum*
1	100	65.67±0.13	30.25±0.12	36.54±0.10
2	200	82.73±0.13	33.42±0.16	38.83±0.11
3	300	92.65±0.15	35.27±0.12	40.36±0.08
4	400	95.35±0.13	37.36±0.11	42.64±0.14
5	500	96.74±0.08	39.26±0.13	44.84±0.07

Table- 4. DPPH free radical scavenging activity of Acetone seaweed

No	Concentration (µg/ml)	% of activity (±S.D)		
		Standard (Ascorbic acid)	*Valoniopsis pachynema*	*Stoechospermum marginatum*
1	100	65.67±0.13	19.76±0.08	27.47±0.07
2	200	82.73±0.13	23.38±0.10	30.54±0.10
3	300	92.65±0.15	25.76±0.09	33.55±0.11

4	400	95.35±0.13	27.56±0.14	35.38±0.11
5	500	96.74±0.08	29.83±0.09	37.64±0.12

Table- 5. DPPH free radical scavenging activity of chloroform seaweed

No	Concentration (µg/ml)	% of activity (± S.D)		
		Standard (Ascorbic acid)	*Valoniopsis pachynema*	*Stoechospermum marginatum*
1	100	65.67±0.13	22.36±0.09	30.36±0.14
2	200	82.73±0.13	23.34±0.11	32.86±0.08
3	300	92.65±0.15	25.75±0.12	37.56±0.07
4	400	95.35±0.13	27.76±0.10	38.56±0.12
5	500	96.74±0.08	31.75±0.12	40.45±0.10

Table- 6. DPPH free radical scavenging activity of Ethyl alcohol seaweed extract

NO	Concentration (µg/ml)	% of activity (± S.D)		
		Standard (Ascorbic acid)	*Valoniopsis pachynema*	*Stoechospermum marginatum*
1	100	65.67±0.13	25.66±0.08	32.85±0.09
2	200	82.73±0.13	28.36±0.08	35.25±0.12
3	300	92.65±0.15	30.85±0.11	38.73±0.12
4	400	95.35±0.13	32.74±0.12	41.36±0.15
5	500	96.74±0.08	35.56±0.14	42.76±0.12

Table- 7. DPPH free radical scavenging activity of Ethyl acetate seaweed

Parameters	Multiple R	R-Square	df	Slope	Y-intercept	t-value	P-value
DPPH&DW-VP	0.997	0.994	5	0.025	18.41	21.47	0.0002
DPPH&A-VP	0.994	0.989	5	0.022	28.52	16.04	0.0005
DPPH&C-VP	0.991	0.982	5	0.024	17.96	12.92	0.0010
DPPH&EAL-VP	0.977	0.955	5	0.232	19.23	7.97	0.0041
DPPH&EAC-VP	0.998	0.997	5	0.024	23.38	30.23	7.95
DPPH&DW-SM	0.960	0.922	5	0.023	28.75	5.97	0.0094
DPPHA-SM	0.998	0.997	5	0.020	34.52	29.09	8.92
DPPH&C-SM	0.995	0.989	5	0.025	25.36	16.59	0.0004
DPPH&EAL-SM	0.975	0.951	5	0.026	28.19	7.61	0.0047
DPPH&EAC-SM	0.992	0.983	5	0.259	30.41	13.25	0.0009

Table 8.Student t test and Anova for DPPHscavenging and concentration of the extracts of *Valoniopsis pachynema* and *Stoechospermum marginatum*

IV.DISCUSSION

The present study was on comparative analysis of phytochemicals and antioxidants activity of various extracts of two seaweeds, *Valoniopsis pachynema* and *Stoechospermum marginatum*. The phytochemical analysis revealed that presence of different biogenic compounds. All phytochemicals such as alkaloids, steroids, flavonoids, phenol, coumarins, cardiac glycosides, tannins, terpenoids and saponins were found in both algae.

Alkaloids are organic compounds; they are cyclic in structure containing nitrogen in a negative oxidative state. They considered as reserve substances to supply nitrogen. They are also considered as a poisonous substance to protect the plant itself from any stress condition. Alkaloids are found in macro algae and they are divided into three groups; phenylethylamine alkaloid, indole alkaloid and halogenated indole alkaloid. It is an important phytochemical used in the development of drugs and they can be used against some serious diseases. Tannins also used for development of drugs which is used as astringent. Also have the anti-inflammatory, antibacterial, antioxidant and anti-viral property. Tannins pharmaceutically used as the healing agent [11].

Phenols have several biological activities most important one among them is antioxidant properties. Coumarins are used as anti-coagulant to treat lymphedema. Cardiac glycosides involve in the treatment of cardiac failure and help in treatment of cancer because they have diverse range of biochemical effects in cell growth and development. Terpenoids play a significant role in industrial relevant chemicals including pharmaceuticals, pesticides, and flavours [12]. Flavonoids are hydroxylated phenolic substance and soluble free radical scavenger. Steroids help in regulation of various body functions and that mimics the masculine effect of the male sex hormone, testosterone. Saponins have the strong inhibitory effect on inflammation. It become reduces cancer risk and cholesterol and also it act as immunity booster.

In the phytochemical analysis of *Valoniopsis pachynema* and *Stoechospermum marginatum*, we can see that acetone extracts of both algae show maximum abundance of phytochemicals. In comparative study ethyl alcohol extract of *Valoniopsis pachynema* show presents of all the phytochemicals, but *Stoechospermum marginatum* give all the phytochemicals in both acetone and ethyl alcohol extracts. These results are agree with findings of [13] reported that different solvents have the capacity to extract different phytochemicals depending upon their solubility or polarity in the solvent. And abundance of phytochemicals varies with the solubility in different extract. Similarly the phytochemicals which is present in acetone extracts of both *Valoniopsis pachynema* and *Stoechospermum marginatum* show maximum abundance so the this result agree with result of [14] that acetone and phenol is highly polar in nature and phytochemicals readily dissolved in it .

In current study of phytochemicals in *Stoechospermum marginatum;* steroids, flavonoids, phenol, coumarins and tannins are show their presents in all five solvent extracts. This result agree with [15] reported that acetone, chloroform, ethyl acetate, chloroform and hexane extracts of *Stoechospermum marginatum* had showed the presence of terpenoids, tannins, phenol and steroids. And steroids were present in all extract. Alkaloid is not present in extract.

Comparing the both macro algae get that; chloroform extracts of both *Valoniopsis pachynema* and *Stoechospermum marginatum* show less presence of phytochemicals. This is due to the solubility or polarity. Chloroform is less active than the other solvents so it will not give all phytochemicals[16]. In this study alkaloid is only show it's abundance in ethyl alcohol extract of both macro algae.

In *Valoniopsis pahynema*, acetone extract revealed the maximum phenol and flavonoid content (8.65±0.07mg/g and 17.66±0.12mg/g respectively) than the other solvent extracts. Acetone extract of *Stoechospermum marginatum* showed high total phenol and flavonoid content (9.7±0.10mg/g and 19.55±0.13mg/g respectively). Phenolic contents are more soluble in polar solvents [14]. Here also see a direct relationship in result between phenol and flavonoid, flavonoid content is increases with increase of phenol content. Phenol and flavonoid content is more in *Stoechospermum marginatum* than *Valoniopsis pachynema*. This is agree with result of [17] that phenol content is higher in brown seaweeds than green and red seaweeds. Least amount of phenol and flavonoid content obtained in chloroform extracts of *Stoechospermum marginatum* and *Valoniopsis pachynema*, this will be due to polarity of chloroform solvent because chloroform is a pretty non-polar solvent.

Flavonoids are well known as nature's tender drug. Flavonoid compounds especially quercetin and genistein are used as anti-tumour activity so they used in cancer cell treatment [18]. Phenols are major group of phytochemical compounds which act as antioxidant agents or free radical scavengers. Many report revealed that phenol and flavonoid contents are responsible for antioxidant activity [19].

Accumulation of Reactive Oxygen species (ROS) occurs by variable environmental conditions such as desiccation, ultraviolet radiation, freezing, high irradiation, low temperature, salinity fluctuations and heavy metals. ROS are causing damage to the photosynthetic apparatus. Seaweeds control the activity of ROS by using antioxidant compounds. ROS have been identified as causing agents in various human diseases also[20].

In the current study, DPPH radical scavenging method was used to evaluate the antioxidant capacity of seaweed extracts. The DPPH antioxidant assay is based on the ability of DPPH, a free radical, to decolourise in the presence of antioxidants. DPPH free radical react with suitable reducing agents, the electrons become paired off, and solution losses its colour from violet to pale yellow. Antioxidants are reducing agents they prevent or delay the oxidative change and scavenging the free radicals. Antioxidant activity of marine algae may arise from pigments like carotenoids and chlorophyll, phenolic compounds, flavonoids, vitamins, terpenoids etc, which directly or indirectly contribute to the preventing the oxidation process [21].

In the present study, the seaweed extracts has high DPPH scavenging activity which is increased with increasing concentration (Concentration ranges from 100µg/ml to 500µg/ml). DPPH free radical scavenging activity of different extracts of *Valoniopsis pachynema* and *Stoechospermum marginatum* revealed that acetone extracts of both have high DPPH free radical scavenging activity (concentration at 500µg/ml, 39.26±0.13% and 44.84±0.07% respectively). This result agree with the findings of [22]. In this study concluded that for *Stoechospermum marginatum*, acetone and ethyl acetate solvents are show more antioxidant activity than other solvents. Chloroform extracts of both algae show minimum free radical scavenging activity (29.83±0.09% and 37.64±0.12% respectively). In current study of distilled water extract of *Stoechospermum marginatum* also show free radical scavenging activity(39.65%±0.14%, at 500µg/ml), This result agree with the findings of [23].

Methanolic extract of *Valoniopsis pachynema* have highher antioxidant activity[24]. He concluded that polar solvent extract of *Valoniopsis pachynema* become show high antioxidant activity because of high phenol and flavonoid content. The antioxidant activity and phytochemical compounds in *Valoniopsis pachynema*; find that high antioxidant activity due to the bioactive compounds like phenol, flavonoid, terpinoids, and steroids[25].

Comparing the results of present study; show that high antioxidant activity by *Stoechospermum marginatum* than *Valoniopsis pachynema*. This findings are agreement with study of [26] revealed that in

Stoechospermum marginatum have high phenol and flavonoid content also high antioxidant activity. Phenol and flavonoid content are responsible for the antioxidant activity. Phenol and flavonoid content increase then the antioxidant activity become directly increases. The current findings were agreement with [27]; here also the phenol and flavonoid content are higher in *Stoechospermum marginatum* than *Valoniopsis pachynema*, and also correlation with antioxidant activity. The current findings agree with results of [15]; *Stoechospermum marginatum* have high antioxidant activity in acetone extract also in ethyl acetate extracts.Brown seaweeds have high free radical scavenging activity than the green seaweeds[24]. Current results are agreement with this finding.

The results obtained from the study suggest that both algae are valuable reservoir of biogenic compounds; these phytochemical compounds are great interest to the medical field. Comparing the results *Stoechospermum marginatum* have more abundance of phytochemical constituents, total phenolic and flavonoid content and free radical scavenging activity than *Valoniopsis pachynema*. The current study reveals that both algae are rich in phenol and flavonoid content and they have strong antioxidant activity. Phytochemical compounds in seaweeds provide contribution to the drug, cosmetic products, immunity boosters and several other medicines and commercially important chemical preparation. Nowadays, higher percentage of population prefers to use remedies of natural origin for curing diseases. Because of their less side effects other than the synthetic one. Therefore, both the seaweeds can be used synthesis of natural antioxidants, and production of valuable chemicals to the medical field.

V.CONCLUSION

In the present study it can be concluded that, all the phytochemicals present in both of the algae, *Valoniopsis pachynema* and *Stoechospermum marginatum*. It shows variation in the presence of phytochemicals in their different solvents because of its differential solubility or their polarity. The polar solvents are shows good presence of phytochemical components, thus they have good solubility capacity. Acetone extract of both algae show most promising result for phytochemicals, total phenol and flavonoid content and DPPH free radical scavenging activity. When comparing the two algae *Stoechospermum marginatum* have been give more promising result than *Valoniopsis pachynema*.

REFERENCES

[1]. Kuda, T., Tsunekawa, M., Goto, H and Araki, Y. 2005. Antioxidant properties of four edible algae harvested in the Noto Peninsula, Japan. Journal of Food Composition and Analysis. 18: 625-633.

[2]. Dawcyznski, C., Schubert, R and Jabrels, G. 2007. Aminoacids, fattyacids, a dietary fibre in edible seaweed products. Food Chemistry. 103: 891-899.

[3]. Nwosu, F., Morris, J., Lund, V. A., Stewart, D. J., Ross, H. A and McDougall, G. J. 2011. Anti- proliferative and potential anti-diabetic effects of phenolic-rich extract from edible marine algae. Food Chemistry. 126: 1006-1012.

[4]. Manach, C., Scalbert, A., Morand, C., Remesy, C and Jimenez, L. 2004. Polyphenols: food source and bioavailability. Am. J. Clin. Nutr. 79: 227-747.

[5]. Stoclet, J. C., Chataigneau, T., Ndiaye, M., Oak, M. H., Bedoui, E. I., Chataigneau, M and Sachini-Kerth, V. B. 2004. Vascular protection by dietary polyphenols. European Journal of Pharmacology. 500: 299-313.

[6]. Zubia, M., Robledo, D and Freile-Pelegrin, Y. 2007. Antioxidant activities in tropical marine macro algae from the Yucatan Peninsula, Mexico. Journal of Applied Phycology. 19: 449-458.

[7]. Harbone, J. B. 1998. Phytochemical methods- A guide to modern technologies of plant analysis. Third Edn. Chapman and Londan. 1-295.

[8]. Singleton, V. L and Rossi, J. A. 1965. Calorimetry of total phenolics with the Phosphomolybdic, phosphotungstate acid reagent. American Journal of Enology Viticulture. 6: 144-158.

[9]. Chang, C. C., Yang, M. H., Ucen, H. M and Chen, J. C. 2002. Estimation of total flavonoid content in Propolis by complementary colorimetric method. Journal of Food and Drug Analysis. 10: 178-182.

[10]. Yen, G. H and Chen, H. Y. 1995. Antioxidant activity of various tea extract in relation to their anti-mutagenicity. Journal of Agriculture and Food Chemistry. 43: 27-32.

[11]. Anjum, A., Aruna, G and Noorjahan, C. M. 2014. Qualitative phytochemical analysis and evaluation of total phenolic content of two selected red seaweeds from sea coast of Mandapam, TamilNadu. Weekly Science and Research Journal. 2(7): 1-5.

[12]. Bohlmann, J and Keeling, C. I. 2008. Terpinoid biomaterials. Plant journal. 54(4): 656-669.

[13]. Hediat, M. H and Sulama Najat Marraiki. 2010. Antimicrobial activity and phytochemical analysis of Polygona aviculare L.(Polygonaceae), naturally growing in Egypt. Saudi Journal of Biological Sciences. 17: 57-63.

[14]. Whaterman, P. G and Mole, S. 1994. Analysis of phenolic plant metabolites (methods in ecology). Blackwell Scientific Publications. Oxford, UK.

[15]. Brammavidhya, S., Suganya, S and Arun Prasath. 2017. Production of fucose rich polysaccharide from Stoechospermum marginatum and its antibacterial activity against UTI pathogens. Indo-Asian journal of Multidisciplinary Research. 3(5): 1220-1227.

[16]. Shyamala Viswanathan, Ebciba, c., Santhiya, R and Thangaraju Nallamuthu. 2014. Phytochemical screening and in vitro antibacterial, antioxidant anticancer activity of Amphiroa fragilissima (Linneaus) J V Lamoroux. 2014. International Journal of Innovative Research in Science, Engineering and Technology. 3(5): 12933-12948.

[17]. Chkhikvishvili, I. D and Ramazanov, Z. M. 2000. Phenolic substances of brown algae and their antioxidant activity. Applied Biochemistry of Microbiology. 36: 289-291.

[18]. Divya, S. R., Padmaja, M., Dhanarajan, M. S and Chandra Mohan, A. 2013. Preliminary phytochemical screening, total phenolics, flavonoid and tannin contents of Gracilaria edulis and Gelidium acerosa. International Journal of Bioscience Research. 2: 1-7.

[19]. Nurul Aili Zakaria, Sarah Ibrahim, Shaida Fariza, Sulaiman and Nox Alifah Supardy. 2011. Assessment of antioxidant activity, total phenolic content and in-vitro toxicity of Malaysian red seaweed: Acanthophora spicifera. Journal of Chemical and Pharmaceutical Research. 3: 182-191.
[20]. Harker, M., Berkaloff, C., Lemoine, Y., Britton, G., Young, A., Duval, J., Rmiki, N. E and Rousseau, B. 1999. Effects of high light and dessication on the operation of the xanthophylls cycle in two brown algae. European Journal of Phycology. 34: 35-42.
[21]. Shahidi, F. 2008. Nutraceuticals and functional foods: whole versus processed foods. Trends in Food Science and Technology, Article in press.
[22]. Arumugama, P., Murugan, M., Kamalakannan, S and Murugan, K. 2017. Determination of various bioactive potential of Stoechospermum marginatum (C. Agardh) Kützing, in-vitro. Journal of Analytical and Pharmaceutical Research. 5(4): 1-7.
[23]. Reka Palanivel, Thahira Banu Azeez and Seethalakshmi Muthaya. 2017. Nutrient content, phytonutrient composition, Alpha amylase, Alpha Glucosidase inhibition activity and antioxidant activity of the Stoechospermum marginatum collected in pre monsoon season. Turkish Journal of Agriculture- Food Science and Technology. 5(3): 275-280.
[24]. Devaraj Isaac Dhinakaran, Paramasivam Geetha, Rajalakshmi and Solomon Jeeva. 2015. Antioxidant activities of marine algae Valoniopsis pachynema and Sargasssum swartzii from the south east cost of India. International Journal of Fisheries and Aquatic Studies. 3(2): 426-430.
[25]. Geena George and Lizzy Mathew. 2017. Antioxidant potential of four chlorophycean members from Kerala coast. International Journal of Scientific Research. 6(7): 66-68.
[26]. Akbar Esmaeili and Marjan Khakpoor. 2012. Biological activities and chemical composition of solvent extract of Stoechospermum marginatum (C. Agardh). ACTA ABP Biochimica Polonica. 59(4): 581-585.
[27]. Shibata, T., Ishimaru, A., Kawaghuchi, S., Yoshikawa, S and Hana, Y. 2008. Antioxidant activities of phlorotannins isolated from Japanese Laminariaceae. Journal of Applied Phycology. 20: 705-711.