Research Article **Biotechnology**

International Journal of Pharma and Bio Sciences

ISSN 0975-6299

PHYTOCHEMICAL ANALYSIS OF *Enteromorpha flexuosa* AND *Ulva lactuca:* A COMPARATIVE STUDY

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ABSTRACT

South coastal line of Tamil Nadu consists of a wide variety of seaweeds that are having abundant bioactive compounds which are useful in drug design. In this investigation, various solvent extracts of *Enteromorpha flexuosa* and *Ulva lactuca* were analyzed qualitatively of their bioactive compounds. Results revealed that extracts of *U.lactuca* have more phytochemical constituents than the extracts of *E.flexuosa.* Phenol, Tannin and cardiac glycosides were present in a higher amount in the extracts of *E.flexuosa.* Cardiac glycoside and phlobatanin was found to be abundant in the extracts of *U.lactuca.* Amino acids and carbonyl compound were found to be absent in both algal extracts.

KEYWORDS: ***E.flexuosa. U.lactuca*, extracts, phytochemicals.**

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INTRODUCTION

Algae are simple photosynthetic plants with a unicellular reproductive structure the range from unicellular organisms to non vascular filamentous are thalloid plants[1]. Seaweeds are used by human for various purposes such as food, pharma etc. Seaweed produces various types of antioxidant that counteract environmental stresses. Hence it is considered as a potential source of novel antioxidants[2]. They are the richest source of vitamin A, B1, B12, C, D and E[3]. Carotenes are found rich in red brown algae[4]. Biologically active compounds extracted from some seaweed species, namely Phaeophyceae, Rhodophyceae and Chlorophyceae were proven to have potential medicinal activities such as antibacterial, antiviral, antitumour, antifungal, antimicrobial, antiprotozoal, antioxidant, and mosquito and larva control[5-9]. Phytochemical constituents of various plant extracts were also used for treating paint industry effluent[10]. Recent studies revealed that marine algae has tremendous source of novel and diverse array of marine secondary metabolites[11]. Seaweeds also contain a wide range of unique phytochemicals that are not present in terrestrial plants. Phytochemicals help in protection against chronic diseases. Alkaloids protect against chronic disease[12]. Studies have shown that the high antioxidant capacity of a range of edible seaweeds. This capacity is gifted by the presence of sulphated polysaccharides, polyphenolic compounds and antioxidant enzymes[13]. Previous studies in animal models and cell culture have shown that the phytochemicals of seaweeds have the ability to inhibit the progression of carcinoma formation. Very few studies have been undertaken to document the role of Enteromorpha spp. and Ulva lactuca as primary producers in Sundarbans ecosystem[14]. In this present study phytochemicals of *E.flexuosa* and *U.lactuca* was analyzed qualitatively with various solvents.

Collection of sample

Seaweeds such as *Ulva lactuca* and *Enteromorpha flexuosa* were collected from Covelong, Tamil Nadu, India. They were washed thoroughly and dried under sun light. Then they were powdered by mixer and stored.

Preparation of plant extract

The powdered samples of *U.lactuca* and *E.flexuosa* were kept in different solvents such as methanol, ethanol, chloroform and benzene for 48 hrs. Then using filter paper, the samples were filtered and filtrate was collected.

Phytochemical analysis

The phytochemical constituents of plant material were analysed for all the extracts. Phenol and flavanoids were estimated by ferric chloride test. Steroids, triterpenoids and terpenoids were estimated by Salkowski test. Carboxylilc acid was analysed by sodium bicarbonate test. Molisch's test was performed for estimating glycosides. Neutral ferric chloride test was followed for tannins. Aminoacid was estimated by ninhydrin test. Cardiac glycosides were estimated by Killer Killani test. By Borntrager's test anthraquinone was analyzed.

Estimation of carbonyl

Extracts were treated with 2,4 diphenyl hydrazine and were shaked well. Fromation of yellow crystals confirms the presence of carbonyl groups.

Saponin Test

Extract was mixed with distilled water and boiled. Then the mixture was shaked vigorously. Appearance of froth confirms the presence of saponin.

C*oumarin Test*

Extracts of algae were treated with 1N NaOH or KOH. Appearance of dark yellow color confirms the presence of coumarin.

Phlobatanin Test

Algal Extracts were dissolved in water and filtered. Filtrate was boiled with 2% HCl. Red precipitate gives confirmation of the presence of phlobatanin.

RESULTS & DISCUSSION

The phytochemicals analysis showed that steroids and cardiac glycosides were present in all the extracts in medium amount. Triterpenoids were present in minimal amounts in all the extracts, but in the benzene extract of

E. flexors it was found to be medium amount. *E.flexuosa* extracts have higher amount of phenol content.

Table 1
Phytochemical analysis of Methanolic extracts of E.flexuousa and U.lactca

S.No	Plant constituents	Methanolic extract	
		E.Flexuosa	*U.lactuca*
1	Steroid	++	++
2	Triterpenoids	+	++
3	Terpenoids	++	+
4	Phenol	+++	+
5	Flavanoid	_	+
6	Coumarin	_	+
7	Tannin	+++	_
8	Phlobatanin	_	+++
9	Aminoacid	_	_
10	Carboxylic acid	+	++
11	Glycoside	+	+
12	Cardiac glycoside	+++	+++
13	Carbonyl	_	_
14	Saponins	++	+
15	Anthraquinone	+	+

(Highly Prominent= +++; Medium amount= ++; Fewer amount= +; Absent= -)

Table 2
Phytochemical analysis of ethanolic extracts of E.flexuousa and U.lactca

S.No	Plant constituents	Ethanolic extract	
		E.Flexuosa	*U.lactuca*
1	Steroid	++	++
2	Triterpenoids	+	+
3	Terpenoids	++	+
4	Phenol	+++	+
5	Flavanoid	_	+
6	Coumarin	_	+
7	Tannin	+++	_
8	Phlobatanin	_	+++
9	Aminoacid	_	_
10	Carboxylic acid	+	++
11	Glycoside	+	+
12	Cardiac glycoside	+++	+++
13	Carbonyl	_	_
14	Saponins	++	+
15	Anthraquinone	+	+

(Highly Prominent= +++; Medium amount= ++; Fewer amount= +; Absent= -)

Table 3
Phytochemical analysis of chloroform extracts of E.flexuousa and U.lactuca

S.No	Plant constituents	Chloroform extract	
		E.Flexuosa	*U.lactuca*
1	Steroid	++	++
2	Triterpenoids	+	+
3	Terpenoids	++	+
4	Phenol	+++	+
5	Flavanoid	_	+
6	Coumarin	_	+
7	Tannin	+++	_
8	Phlobatanin	_	+++
9	Aminoacid	_	_
10	Carboxylic acid	+	_
11	Glycoside	+	+
12	Cardiac glycoside	+++	+++
13	Carbonyl	_	_
14	Saponins	++	+
15	Anthraquinone	+	+

(Highly Prominent= +++; Medium amount= ++; Fewer amount= +; Absent= -)

Table 4
Phytochemical analysis of benzene extracts of E.flexuousa and U.lactuca

S.No	Plant constituents	Benzene extract	
		E.Flexuosa	*U.lactuca*
1	Steroid	++	++
2	Triterpenoids	+	+
3	Terpenoids	++	+
4	Phenol	+++	+
5	Flavanoid	_	+
6	Coumarin	_	+
7	Tannin	+++	_
8	Phlobatanin	_	+
9	Aminoacid	_	_
10	Carboxylic acid	+	_
11	Glycoside	+	+
12	Cardiac glycoside	+++	+++
13	Carbonyl	_	_
14	Saponins	++	+
15	Anthraquinone	+	+

(Highly Prominent= +++; Medium amount= ++; Fewer amount= +; Absent= -)

Extracts of *U.lactuca* contained fewer amount of phenol (Table 1-4). Flavanoids and coumarin were absent in extracts of *E.flexuosa* and present in *U.lactuca* in a little amount. *E.flexuosa* has higher amount of tannin and it was absent in *U.lactuca.* Phlobatanin was present as higher amount in extracts of *U.lactuca* (Table 1-4) but is lesser in benzene extracts of *U.lactuca* (Table 4) and is absent in *E.flexuosa* extracts. Extracts of *E.flexuosa* have a fewer amount of carboxylic acid. In methanolic and ethanolic extracts of *U.lactuca* carboxylic acid was found to be medium amount (Table 1,2) and it was absent in benzene and chloroform extracts of *U.lactuca* (Table 3,4). Amino acid and carbonyl contents were absent in all the extracts. Both algal extracts have glycoside and anthraquinone in lesser amount. Saponin was present in medium in *E.flexuosa* extracts and is lesser in *U.lactuca* (Table 1-4).

CONCLUSION

Screening for phytochemicals of two seaweeds study showed that the presence of bioactive compounds, but differs from each other. In future studies, other bioactive compounds of *E. flexuosa* and *U. Lactuca* may be analyzed qualitatively and also quantitatively with different solvent extracts.

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