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SCREENING OF PRELIMINARY PHYTOCHEMICAL PROFILE OF *GRACILARIA TEXTORII* (SURING.) J. AG. COLLECTED FROM KANYAKUMARI COAST, TAMIL NADU, INDIA

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ABSTRACT

The present study was carried out to screen the preliminary phytochemicals of *Gracilaria textorii* (Suring.) J. Ag. from Kanyakumari coast, the south east coast of Tamil Nadu, India. The preliminary phytochemical analysis was conducted in seven extracts namely methanol, acetone, chloroform, ethyl acetate, petroleum ether, hexane and benzene by Harborne method. The preliminary phytochemical analysis showed the presence of alkaloids, anthocyanin, anthraquinones, cardiac glycosides, catechin, coumarins, diterpenes, emodins, flavonoids, glycosides, leucoanthocyanin, lignins, phenols, phlobatannins, quinones, saponins, steroids, tannins, terpenoids and triterpenoids. From the results, it was observed that the extracts of *Gracilaria textorii* (Suring.) J. Ag. showed the presence of variety active secondary metabolites. The current report will show the way to the isolation and characterization of the particular active secondary metabolites for the further research in future.

KEYWORDS

Phytochemical, Bioactive compounds, Seaweed extracts, *Gracilaria* and Tamil Nadu.

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INTRODUCTON

Seaweed is considered a medicinal substance with wet, softening properties which according to traditional Chinese medicine which enables it to dissolve hard nodules and tumors and to reduce swelling of the thyroid and lymph glands. Seaweed helps decongest swollen or inflamed lymph nodes; it can be consumed as a treatment for auto-immune illnesses, including chronic fatigue, HIV, arthritis and chronic allergies[1]. The medicinal value of seaweeds lies in some chemical substances that produce a definite physiological action on the

human body. The most important of these bioactive constituents of seaweeds are alkaloids, tannins, steroids, saponin, flavonoids and phenolic compounds[2].

The knowledge of the chemical constituents of plants would also be valuable in discovering the actual value of remedies[3]. A number of phytochemicals include amino acids, phenolic compounds, sterols, terpenoids, isopyrenoids, phlorotannins, steroids, halogenated ketones, alkanes, cyclic polysulphides, fatty acids and acrylic acid have been isolated previously in seaweeds. From the previous reports, botanists, chemists, pharmacologists and physiologists have concentrated their attention to the marine organisms particularly on seaweeds for screening various bioactive substances. Several works have been undertaken on crude and purified compounds obtained from seaweeds for evaluating the bioactive potential[4]. Hence the present study was carried out to screen the preliminary phytochemicals from *Gracilaria textorii* (Suring.) J. Ag. collected from Kanyakumari coast, Kanyakumari district, Tamil Nadu, India.

MATERIAL AND METHODS

Collection of Plant sample

The plant materials used in the present study *Gracilaria textorii* (Suring.) J. Ag., belonging to Rhodophyceae (red algae) was made during the low tidal and subtidal regions (up to 1m depth) by hand picking. The collected plant samples were washed thoroughly with marine water in the field itself to remove the epiphytes and sediment particles. Followed by, the plant samples were filled separately in polythene bags in wet condition and brought to the laboratory, and thoroughly washed with tap water followed by distilled water to remove the salt on the surface of the thalli. They were stored in 5% formalin solution[5].

Preparation of extracts

For preparing various solvent extracts, the plant specimens were washed thoroughly and placed on blotting paper and spread out at room temperature in the shade condition for drying. The dried specimens were made to fine powder using a tissue blender. The powdered samples were stored in the refrigerator for further use. 30g powdered samples were packed in Soxhlet apparatus and extracted with methanol, acetone, chloroform, ethyl acetate, petroleum ether, hexane and benzene for 8h separately[6].

Preliminary phytochemical analysis

The different extracts (methanol, acetone, chloroform, ethyl acetate, petroleum ether, hexane and benzene) of *Gracilaria textorii* (Suring.) J. Ag. were tested for alkaloids, anthocyanin, anthraquinones, cardiac glycosides, catechin, coumarins, diterpenes, emodins, flavonoids, glycosides, leucoanthocyanin, lignins, phenols, phlobatannins, quinones, saponins, steroids, tannins, terpenoids and triterpenoids. Phytochemical screening of the extracts was carried out according to the standard methods[7].

Test for alkaloids

1ml of 1% HCl was added with 2ml of extract and was treated with few drops of Mayer's reagent. A creamy white precipitate indicates the presence of alkaloids.

Test for anthocyanin

1ml of 2N HCl was added to the 1ml of extract and was treated with NH_3. Pink red colour turns blue violet.

Test for anthraquinone

2ml of extract was mixed with 1ml of benzene and 1ml of 10% ammonia solution was added. The presence of red or violet color indicates the anthraquinones.

Test for cardiac glycosides

0.4ml of glacial acetic acid was added with 1ml extract and trace amount of $FeCl_3$. Blue colour indicates the presence of cardiac glycosides.

Test for catechin

1ml of plant extract was mixed with few drops of ehrlich's reagent was treated with few drops of conc. HCl. pink color indicates catechin.

Test for Coumarins

1ml of extract was added with 1ml of 10% NaOH. The formation of yellow colour indicates the presence of coumarins.

Test for diterpenes

1ml extract was added with 1ml dis. H_2O and 10 drops of copper acetate solution. Emerald green colour indicates the presence of diterpenes.

Test for emodins

1ml plant extract was added with 2ml of NH_4OH and treated with 3ml of benzene. Red color indicates emodins.

Test for flavonoids

Two drops of 1% NH_3 solution was added to 2 ml of extract in a test tube. Yellow coloration indicates the presence of flavonoids.

Test for glycosides

A few drops of 50% H_2SO_4 was added to 2ml of extract in a boiling tube. The solution was heated in boiling water bath for 5 min. 10ml of Fehling's solution was added and boiled. A red precipitate indicates the presence of glycosides.

Test for leucoanthocyanin

1ml of plant extract was mixed with 1ml of is oamyl alcohol. Upper layer appear red in color indicates leucoanthocyanin.

Test for lignins

1ml of plant extract treated with gallic acid. Formation of olive green color indicates lignins.

Test for phenols

To 1ml extract, add 2ml distilled water followed by few drops of 10% ferric chloride. The formation of blue or black colour indicates the presence of phenolic groups.

Test for phlobatannins

1ml extract was added with 1% aqueous HCl and then boiled. Red precipitate indicates the presence of phlobatannins.

Test for quinones

1ml seaweed extract added with 1ml of alcoholic KOH. Red to blue colour indicates the presence of quinones.

Test for saponins

2ml of extract was shaken vigorously with 5ml distilled water to obtain stable persistent foam. The formation of emulsion indicates the presence of saponins.

Test for steroids

1ml of extract added to 1ml $CHCl_3$ and few drops of Conc. H_2SO_4. Golden red colour or Brown colour indicates the presence of phytosteroids.

Test for tannins

To 2ml extract, 1ml of distilled water and 1-2 drops of ferric chloride solution was added and observed for brownish green or a blue black coloration indicates the presence of tannins.

Test for terpenoids

2ml extract was mixed with 2ml of $CHCl_3$ in a test tube. 3ml Conc. H_2SO_4 was added carefully along the wall of the test tube to form a layer. An interface with a reddish brown coloration confirms the presence of terpenoids.

Test for triterpenoids

1ml of plant extract was added with 1ml of $CHCl_3$ and treated with few drops of Conc. H_2SO_4. Yellow color lower layer indicates triterpenoids.

RESULTS AND DISCUSSION

In the preliminary phytochemical analysis of *Gracilaria textorii* (Suring.) J. Ag., twenty secondary metabolites (alkaloids, anthocyanin, anthraquinones, cardiac glycosides, catechin, coumarins, diterpenes, emodins, flavonoids, glycosides, leucoanthocyanin, lignins, phenols, phlobatannins, quinones, saponins, steroids, tannins, terpenoids and triterpenoids) were tested in seven different extracts. Thus, out of 1x7x20=140 tests were conducted, 85 tests gave positive results and the remaining gave negative results.

Hex: Hexane

The 85 positive results showed the presence of alkaloids, anthocyanin, anthraquinones, cardiac glycosides, catechin, coumarins, diterpenes, emodins, flavonoids, glycosides, leucoanthocyanin, lignins, phenols, phlobatannins, quinones, saponins, steroids, tannins, terpenoids and triterpenoids. Alkaloids, saponins, steroids, tannins and terpenoids showed the maximum presence, being found in seven different extracts, triterpenoids were found in six extracts, followed by cardiac glycosides, coumarins and flavonoids were found in five extracts. Lignins and phenols were present in four different extracts followed by catechin, diterpenes,

glycosides and phlobatannins were present in three different extracts. Anthocyanin, anthraquinones, leucoanthocyanin and quinones were found in two extracts followed by emodins was found in only one extract.

Among the seven different extracts, the methanol extract showed the presence of the maximum number (19) of compounds and followed by, the acetone extract showed thirteen compounds. Next to acetone extract, chloroform, ethyl acetate and benzene extracts with the presence of twelve compounds each, petroleum ether extract with ten compounds. The hexane extract showed seven compounds (Table No.1).

Table No.1: Preliminary phytochemical analysis of *Gracilaria textorii* (Suring.) J. Ag

S.No	Tests	Solvents						
		Met.	Ace.	Chl.	EA	PE	Ben.	Hex.
1	Alkaloids	+	+	+	+	+	+	+
2	Anthocyanin	-	-	+	-	+	-	-
3	Anthraquinones	+	+	-	-	-	-	-
4	Cardiac glycosides	+	-	-	+	+	+	+
5	Catechin	+	-	-	+	-	+	-
6	Coumarins	+	+	+	+	-	+	-
7	Diterpenes	+	+	-	-	+	-	-
8	Emodins	+	-	-	-	-	-	-
9	Flavonoids	+	+	+	+	-	+	-
10	Glycosides	+	-	+	-	+	-	-
11	Leucoanthocyanin	+	-	+	-	-	-	-
12	Lignins	+	+	-	+	-	+	-
13	Phenols	+	+	-	+	-	+	-
14	Phlobatannins	+	+	+	-	-	-	-
15	Quinones	+	-	-	+	-	-	-
16	Saponins	+	+	+	+	+	+	+
17	Steroids	+	+	+	+	+	+	+
18	Tannins	+	+	+	+	+	+	+
19	Terpenoids	+	+	+	+	+	+	+
20	Triterpenoids	+	+	+	-	+	+	+

Met: Methanol Ace: Acetone Chl: Chloroform
EA: Ethyl acetate PE: Petroleum ether Ben: Benzene

CONCLUSION

From the present study, it was concluded that *Gracilaria textorii* (Suring.) J. Ag. showed the presence of a number of active secondary metabolites such as alkaloids, anthocyanins, anthroquinones, cardiac glycosides, coumarins, diterpenes, flavanoids, glycosides, phenols, phlobatannins, phytosteroids, quinones, saponins, tannins and terpenoids. From the results, it can be observed that the different extracts of *Gracilaria textorii* (Suring.) J. Ag. showed the presence of numerous active secondary metabolites which can direct the isolation and characterization of these active secondary metabolites in future.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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