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SCREENING OF PRELIMINARY PHYTOCHEMICALS IN METHANOLIC EXTRACT OF *CAULERPA RACEMOSA* (FORSSK.) WEB. V. BOSSE FROM IDINTHAKARAI, TIRUNELVELI DISTRICT, TAMIL NADU, INDIA

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Abstract:
In the present study, the preliminary phytochemical constituents of Caulerpa racemosa (Forssk.) Web. V. Bosse, collected from Idinthakarai coast, Tirunelveli district in the south east coast of Tamil Nadu, India was carried out. The preliminary phytochemical analysis was conducted in five various solvent extracts namely methanol, acetone, chloroform, ethyl acetate and benzene by Harborne method. The preliminary phytochemical analysis showed the presence of alkaloids, anthocyanins, anthroquinones, cardiac glycosides, coumarins, diterpenes, flavanoids, glycosides, phenols, phlobatannins, phytosteroids, quinones, saponins, tannins and terpenoids. Saponin showed the maximum presence, being found in four different extracts. And anthraquinones, phlobatannins and quinones found in only one extract. From the results, it can be observed that the extracts of Caulerpa racemosa were found to be the presence of a number of active secondary metabolites.

Key words: *Phytochemical, Bioactive compounds, Seaweed extracts, Caulerpa racemosa, Tamil Nadu*

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INTRODUCTION:

Marine organisms are not generally used in traditional medicine, but recently they represent a massive resource for the development of potential therapeutic agents in the field of medicine [1]. Most of the marine organisms are soft-bodied and they are not able to use mechanical defense mechanisms like shelter or ability to escape, thus they need chemical defense mechanisms to survive [2]. Therefore, they have created an efficient defense mechanism that helps them to survive during evolution and to avoid extinction [3]. This mechanism encompasses the ability to synthesise or accumulate toxic metabolites and the secretion of highly toxic metabolites as they are rapidly diluted in the ocean water [4]. The metabolites secreted by marine organisms are characterized by the presence of halogen unlike the terrestrial secondary metabolites [5]. For these reasons, and because of the high biological diversity in the sea [6, 7], marine organisms have attracted researchers to find useful drugs for mankind [8]. Therefore, the aim of this paper is to find out the phytochemical constituents of *Caulerpa racemosa* (Forssk.) Web. V. Bosse, collected from Idinthakarai coast, Tirunelveli district in the south east coast of Tamil Nadu, India.

MATERIALS AND METHODS:

Collection of Plant Sample

The plant materials used in the present study was *Caulerpa racemosa* (Forssk.) Web. V. Bosse, belonging to Chlorophyceae (Green algae) was made during the low tidal and subtidal regions (up to 1m depth) by hand picking. The collected materials were washed thoroughly with marine water in the field itself to remove the epiphytes and sediment particles. Then the samples were packed separately in polythene bags in wet conditions and brought to the laboratory, then thoroughly washed in tap water followed by distilled water to remove the salt on the surface of the thalli. They were stored in 5% formalin solution.

Preliminary phytochemical analysis

The different extracts (methanol, acetone, chloroform, ethyl acetate and benzene) of *Caulerpa racemosa* (Forssk.) Web. V. Bosse were tested for alkaloids, anthocyanins, anthroquinones, cardiac glycosides, coumarins, diterpenes, flavanoids, glycosides, phenols, phlobatannins, phytosteroids, quinones, saponins, tannins and terpenoids. Phytochemical screening of the extracts was carried out according to the standard methods [9].

Preparation of extracts

For the preparation of different 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 shade dried samples were grounded to fine powder using a tissue blender. The powdered samples were then stored in the refrigerator for further use. 30g powdered samples were packed in Soxhlet apparatus and extracted with methanol, acetone, chloroform, ethyl acetate and benzene for 8h separately [10].

Test for alkaloids

1ml of 1% HCl was added to the 2ml of extract in a test tube 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 a pink, 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 $FeCl_3$ and 0.5ml Conc. H_2SO_4. Blue colour indicates the presence of cardiac glycosides.

Test for coumarins

1ml of extract was added with 1ml of 10% NaOH. 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 flavonoids

A few 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

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

Test for phenolic groups

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 phytosteroids
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 quinones
1ml 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 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.

RESULTS AND DISCUSSION:

The marine world, due to its extraordinary biodiversity, is a rich natural resource of many biologically active compounds. Among the many marine organisms, seaweeds live in complex habitats exposed to extreme conditions and, in adapting to new environmental surroundings, they produce a wide variety of secondary metabolites which cannot be found in other organisms. Seaweed-based bioactive compounds can be derived from three groups namely Chlorophyceae, Phaeophyceae and Rhodophyceae, all of which contain their own unique set of biomolecules.

In the present study, preliminary phytochemical analysis of *Caulerpa racemosa* (Forssk.) Web. V. Bosse (Chlorophyceae), fifteen different types of secondary metabolites (alkaloids, anthocyanins, anthroquinones, cardiac glycosides, coumarins, diterpenes, flavanoids, glycosides, phenols, phlobatannins, phytosteroids, quinones, saponins, tannins and terpenoids) were tested in five different extracts. Thus, out of 1x5x15=75 tests for the presence or absence of the above compounds, 34 tests gave positive results and the remaining gave negative results.

Table 1: Preliminary phytochemical analysis of *Caulerpa racemosa* (Forssk.) Web. V. Bosse

Tests	SOLVENTS				
	Methanol	Acetone	Chloroform	Ethyl acetate	Benzene
Alkaloids	+	+	+	-	-
Anthocyanin	+	-	-	+	-
Anthraquinone	-	-	+	-	-
Cardiac Glycosides	-	+	-	+	-
Coumarins	+	-	+	-	-
Diterpenes	-	-	-	+	-
Flavonoids	+	+	-	-	+
Glycosides	+	-	+	+	-
Phenols	+	-	-	-	+
Phlobatannins	+	-	-	-	-
Phyto steroids	+	+	-	-	+
Quinones	-	-	+	-	-
Saponins	+	+	-	+	+
Tannins	+	-	-	+	+
Terpenoids	-	+	+	-	+

Among the 75 tests were carried out in the selected extracts of *Caulerpa racemosa*, The 34 positive results showed the presence of alkaloids, anthocyanins, anthroquinones, cardiac glycosides, coumarins, diterpenes, flavanoids, glycosides, phenols, phlobatannins, phytosteroids, quinones, saponins, tannins and terpenoids. Saponin showed the maximum presence, being found in four different extracts. Flavonoids, glycosides, phytosteroids, tannins and terpenoids were found in three extracts. Anthocyanin, cardiac glycosides, coumarins and phenols was present in only two different extracts. And anthraquinones, diterpenes, phlobatannins and quinones found in only one extract. Among the five different extracts, the methanol extract showed the presence of the maximum number (10) of compounds. Next to methanol extract, acetone, chloroform and benzene extracts showed the presence of six compounds,

and the ethyl acetate extract showed six compounds (Table 1).

CONCLUSION:

From the present study, it was observed that *Caulerpa racemosa* (Forssk.) Web. V. Bosse 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. Saponin showed the maximum presence, being found in four various extracts. And anthraquinones, phlobatannins and quinones found in only one extract. From the results, it can be observed that the different extracts of *Caulerpa racemosa* were found to be the presence of a number of active secondary metabolites. This report will direct to the isolation and characterization of these active secondary metabolites for bioefficacy and bioactivity.

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CONFLICT OF INTEREST:

The author declares that she has no conflict of interest.

REFERENCES:

1. Pomponi SA. The bioprocess technological potential of the sea. Journal of Biotechnology, 1999; 70(1-3):5-13.
2. Debitus C. The Fascinating world of sponge chemistry and chemical ecology. In C. Levy (Ed.), Sponges of the new Caledonian lagoon. Paris, Orstrom editions, 1998; Pp.61-64.
3. Muller WEG, Blumbach B, Muller IM. Evolution of the innate and adaptive immune systems: Relationships between potential immune molecules in the lowest metazoan Phylum [Profira] and those in vertebrates. Transplantation, 1999; 68:1215-27.
4. Haefner B. Drugs from the deep: marine natural products as drug candidates. Drug Discovery Today, 2003; 8(12):536-544.
5. Faulkner DJ. Marine natural products. Natural Products Reports, 2002; 19:1-48.
6. Mayer AMS, Lehmann VKB. Marine pharmacology. The Pharmacologist, 2000, 42:62-69.
7. Proksch P, Edrada RA, Ebel R. Drugs from the seas - Current status and microbiological implications. Applied Microbiology and Biotechnology, 2002; 59(2&3):125-134.
8. Satheeshkumar P, Khan AB, Senthilkumar D. Marine organisms as potential supply for drug finding - A review study. Middle-East Journal of scientific Research, 2010; 5(6):514-519.
9. Harborne JB. Phytochemical methods: A guide to modern techniques of plants analysis, Chapman & Hall. London, Ltd., 1998; 1-188.
10. John Peter Paul J, Yuvaraj P. Phytochemical analysis of Padina distromatica Hauck. Indo American Journal of Pharmaceutical Research, 2013; 3(7):5290-5297.