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Preliminary Phytochemical Profile of *Sargassum linearifolium* (Turner) C. Ag. in Koothankuzhi coast, Tirunelveli district, Tamil Nadu, India

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Abstract: The present study was aimed to explore the preliminary phytochemical constituents of *Sargassum linearifolium* (Turner) J.Ag. from Koothankuzhi coast, Tirunelveli district, the south east coast of Tamil Nadu, India. The preliminary phytochemical analysis was conducted in three extracts namely methanol, chloroform and benzene by Harborne method. The preliminary phytochemical analysis showed the presence of anthocyain, alkaloids, cardiac glycosides, coumarins, flavonoids, phenols, phlobatannins, quinones, saponins, steroid, tannins and terpenoids. alkaloids, phenols, steroid, tannins and terpenoids showed the maximum presence, being found in three different extracts and anthocyain, cardiac glycosides, coumarins, flavonoids, phlobatannins, quinones and saponins in two extracts. From the results, it was concluded that the extracts of *Sargassum linearifolium* (Turner) J.Ag. was found to be the presence of a number of active secondary metabolites. This report will lead to the isolation and characterization of these active secondary metabolites for bioefficacy and bioactivity.

Key words: Phytochemical, Bioactive compounds, Seaweed extracts, *Sargassum*, Tamil Nadu.

INTRODUCTION

Marine organism especially marine macro algae commonly known as seaweeds are a rich source of structurally novel and biologically active metabolites. Secondary and primary metabolites produced by seaweeds may be potential bioactive compounds of interest in the pharmaceutical industry. Seaweeds also have the valuable medicinal components such as antibiotics, laxatives, anticoagulants, anti-ulcer products and suspending agents in radiological preparations. Fresh and dry seaweeds are extensively consumed by people especially living in the coastal areas. From the literature, it is observed that the edible seaweeds contain a significant amount of the protein, vitamins and minerals essential for the human nutrition [1].

Currently, seaweeds are used worldwide for many different purposes. The human consumption of seaweed is common in Asian countries, mainly

Japan, China, Korea, Vietnam, Indonesia and Taiwan [2]. In Western countries, seaweeds have been used as sources of phycocolloids and thickening and gelling agents for various applications including food and pharmaceutical industries. Furthermore, they are also used for improving nutrients in animal feed, cosmetics, herbal medicine, fertilizers, etc [3]. Seaweeds are known as valuable sources of protein, elements, dietary fibers, vitamins, essential amino acids and essential fatty acids. 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 [4]. The knowledge of the chemical constituents of plants would also be valuable in discovering the actual value of remedies [5]. Hence the present study was undertaken to evaluate the presence of secondary metabolites in different extracts of *Sargassum linearifolium* (Turner) J.Ag. from Koothankuzhi coast, Tirunelveli district, the south east coast of Tamil Nadu, India.

MATERIALS AND METHODS

Collection of plant materials: The collection of *Sargassum linearifolium* (Turner) C.Ag. (Figure 1) belonging to Phaeophyceae (Brown 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, chloroform and benzene) of *Sargassum linearifolium* (Turner) C.Ag. were tested for anthocyain, alkaloids, anthroquinones, cardiac glycosides, coumarins, flavonoids, glycosides, phenols, phlobatannins, quinones, saponins, steroid, tannins and terpenoids. Phytochemical screening of the extracts was carried out according to the standard methods [6].

Figure 1: Natural habit of *Sargassum linearifolium* (Turner) C.Ag.

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, chloroform and benzene for 8h separately.

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 anthraquinones: 2ml extract was mixed with benzene and 1ml 10% ammonia solution was

added. The presence of a pink, red or violet color indicates the anthraquinones.

Test for arthocyanin :2ml of extract was added with 1ml of 2N NaOH and heated for 5min. the formation of bluish green colour indicated the presence of arthocyanin.

Test for cardiac glycosides : Take 2ml extract, 2ml of glacial acetic acid, 1ml of Conc. sulphuric acid and few drops of 5% ferric chloride. The formation of brown ring indicates the presence of cardiac glycosides.

Test for coumarins : 1ml of extract was added with 1ml of 1N NaOH. The test tubes were kept in boiling water bath for few minutes and shaken well. The appearance of yellow colour indicates the presence of coumarins.

Test for flavonoids: A few drops of 1% NH3 solution was added to 2 ml of extract in a test tube. A yellow Coloration indicates the presence of flavonoids.

Test for glycosides:2ml of 50% H2SO4 was added to the 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 phenolic groups.

Test for phlobatannins: Take 2ml of extract and add 1ml of 10% NaOH solution. The formation of yellow colour indicates the presence of phlobatannins.

Test for quinones: 1ml of extract was added with 1ml of Conc. sulphuric acid. The appearance of red 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 extract was added with 2ml of chloroform and 1ml of sulphuric acid. The formation of reddish brown ring indicates the presence of steroids.

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 CHCl3 in a test tube. 3ml conc. H2SO4 was carefully added along the wall of the test tube to form a layer. An interface with a reddish brown coloration confirms the presence of terpenoids.

CONCLUSION

Based on the results obtained from the present study, it can be concluded that *Sargassum linearifolium* (Turner) J.Ag. was found to be the presence of a number of active secondary metabolites namely anthocyain, alkaloids, cardiac glycosides, coumarins, flavonoids, phenols, phlobatannins, quinones, saponins, steroid, tannins and terpenoids. Alkaloids, phenols, steroid, tannins and terpenoids showed the maximum presence, being found in three different extracts and anthocyain, cardiac glycosides, coumarins, flavonoids, phlobatannins, quinones and saponins in two extracts. This report will lead to the isolation and characterization of these active secondary metabolites for bioefficacy and bioactivity.

Table 1: Preliminary phytochemical analysis of *Sargassum linearifolium* (Turner) C.Ag.

S. No	Test	Methanol	Chloroform	Benzene
1.	Alkaloids	+	+	+
2.	Anthocyain	-	+	+
3.	Anthro quinones	-	-	-
4.	Cardiac glycosides	+	-	+
5.	Coumarins	+	-	+
6.	Flavonoids	+	-	+
7.	Glycosides	-	-	-
8.	Phenols	+	+	+
9.	Phlobatannins	+	-	+
10.	Quinones	+	+	-
11.	Saponins	+	+	-
12.	Steroid/Phytosteroid	+	+	+
13.	Tannins	+	+	+
14.	Terpenoids	+	+	+

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