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PHARMACOGNOSTIC EVALUATION OF GREEN ALGAE, CODIUM ELONGATUM

Pharmaceutical Science

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ABSTRACT

Codium elongatum (Codiaceae) is a green macro alga found in the intertidal zone. Pharmacognostic standardization of Codium elongatum was carried to determine macroscopic, microscopic, and physicochemical parameters according to WHO guidelines. Codium elongatum is a green marine algae, belonging to family Codiaceae. It appears dark green in colour with characterstic smell and salty taste. Microscopically, transverse section through thallus showed the presence of tubular filamentous cells and thick cell walls. Moisture content, ash values, extractive values were also determined. Percentage yield of aqueous extract is higher than other extracts. Phytochemical screening suggests the presence of flavonoids, terprnoids, alkaloids, proteins and carbphydrates. These results are important for establishing identification, quality and purity of herbal drugs.

KEYWORDS

Codium elongatum, Codiaceae, pharmacognostic standardization, green algae, marine algae.

INTRODUCTION

Marine algae can be classified into three categories namely Rhodophyceae, Phaecophyceae and chlorophyceae based on chemical constituent and pigment present in them[1-3]. *Codium elongatum* (Bryopsidale, Cholophyta) belonging to family Codiaceae[4].The genus Codium was widely distributed in temprate and subtropical region and comprises approximate 125 species[5,6]. *C.elongatum* shows the presence of various phytoconstituents like protein, lipid, carbohydrates, fatty acids and fibres[7-10].These secondary metabolites are responsible for pharmacological activities like anti-hyperglycaemic [11], anti- viral[12-14], antioxidant [15,16] and anti- bacterial activity[17,18].

MATERIALS AND METHODS

Plant collection

Algae sample was collected from Marine National Park, Jamnagar (Gujrat) in the month of December. Sample was authenticated as *Codium elongatum* by CSIR- National Botanical Research Institute(NBRI), Lucknow. The specimen was deposited in the algal herbarium of CSIR-NBRI with accession no. 002610.

Macroscopic Characters

In macroscopic examination, parameters such as colour, odour, taste, shape and size were evaluated according to WHO guidelines[19].

Microscopic Characters

For the investigation of the structure of the sample and associated parts, the transverse sections were studied. Preparation of slide included dissection, cleaning, clearing, staining and mounting of the specimens obtained from the drug[20,21].

Physicochemical Characters

Foreign matter, total ash, acid insoluble ash, water soluble ash, sulphated ash, moisture content and extractable matter were calculated according to WHO guidelines[22].

Phytochemical Screening

The powdered plant material extracted with non-polar to polar solvent i.e. Hexane, chloroform, ethyl acetate, ethanol and water. The successive extracts were subjected to preliminary phytochemical screening for the determination of phytoconstituents[23].

RESULT

Macroscopic Characters

Codium elongatum was dark green inncolour with characteristic smell and salty in taste.The thallus is lamellate, ramified dichotomically, erect, attached to the substrate by a formation similar to a disc or to rhizoids. The thallus is dark-green; the branches have spongy consistency and can reach a diameter of 3-10 mm and a height of 15-20 cm (Figure 1).

Figure 1. *Codium Elongatum* Attached To Substratum

Microscopic Characters

Transversal section was made through the thallus of the algae in order to realize the microscopic preparations. The sections were realized with an unused shaving blade. Transversal sections was accomplished by blade cutting through the vegetal material perpendicularly on its axis. The piece of vegetal preparation is placed on a slide, it is covered with cover slip and then it is analyzed under the microscope.

In a transversal section through the thallus, there are tubular filamentous cells with thick cell walls and with numerous small discoid chromatophores, without pyrenoids. The thallus is differentiated into green cortex and colorless medulla. On the outside walls, there are numerous hairs grouped excessively in the median area (Figure 3 and Figure 4).

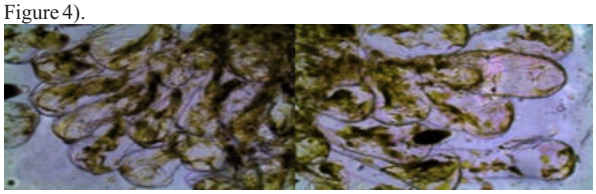

Figure 3. Transeverse Section (10 X)

Figure 4. Transeverse Section (10 X)

Estimation of Physico-chemical Parameters

Various physical constants for *C. elongatum* were determined which includes extractive values, moisture content, ash values etc. and reported in table 1.

Table 1. Physico-chemical Parameters

Standard Parameters	Values [%(W/W) ± SD] n= 3
Foreign matter	92.6± 0.05
Total ash	36.43± 0.05
Acid-insoluble ash	8.2± 0.07
Water soluble ash	21± 0.05
Sulphated ash	55.3± 0.5
Loss on drying	1.86 ± 0.02
Extractive values by maceration	
Chloroform soluble extractive	0.88± 0.05
Ethyl acetate soluble extractive	1.68± 0.05
Ethanol soluble extractive	5.94± 0.03
Water soluble extractive	10.06± 0.01

Extraction And Percentage Yield

In successive extraction process the powdered plant material extracted with non-polar to polar solvent i.e. chloroform, ethyl acetate, ethanol, water so on thebasis of the polarity of contain in the plant material will be extracted out in particular solvent. Percentage yield of extracts were enumerated in table 2.

Table 2. Percentage Yield Of Extract Obtained From Successive Solvent Extraction

S.no.	Extracts	Values [%(W/W) ± SD] n=3
2.	Chloroform	8.43± 0.05
3.	Ethyl acetate	5.12± 0.05
4.	Ethanol	25.36± 0.05
5.	Water	38.24± 0.05

Phytochemical Investigations

Qualitative chemical examination of various extracts revealed by presence of flavonoids, tannins, carbohydrates, triterpenoids, glycosides, alkaloids. Result were enlisted in table 3.

Table 3. Phytochemical Screening Of Successive Solvent Extracts

Phytochemicals	Chloroform	Ethyl acetate	Methanol	water
Carbohydrates	+ve	+ve	+ve	-ve
Protein	+ve	+ve	+ve	+ve
Amino acid	-ve	-ve	+ve	+ve
Steroid	-ve	-ve	+ve	+ve
Flavonoids	+ve	+ve	+ve	+ve
Tannins	-ve	+ve	+ve	-ve
Alkaloids	+ve	+ve	+ve	+ve
Glycosides	+ve	+ve	-ve	+ve
Saponins	-ve	-ve	-ve	+ve
Anthraquinones	+ve	+ve	+ve	-ve
Fats and oils	-ve	-ve	-ve	-ve

DISCUSSION

Standardization of crude drug establishes identity, purity and safety of herbal drugs. This is the first study in which pharmacognostic standards for *C.elongatum* was carried out. Macroscopic character serves as basic diagnostic parameters while microscopic parameter serves as traditional method for precise identity of herbal drugs [24-28]. Sulphated ash value of *C.elongatum* was higher among the other ash values calculated. Extractive value of water souble extract was much higher than chloroform, ethyl acetate and ethanol soluble extract. Percentage yield of aqueous extract was also high. Ash values were useful for determining adulteration. Extractive values helps in the evaluation of chemical constituents of a particular solvent [29].Phytochemical studies revealed the presence of terpenoids, alkaloids, flavonoids, proteins and carbohydrates in various extracts of *C. elongatum.*The evaluation of physical constants are critical for determining adulteration and establishing purity of herbal drugs.

CONCLUSION

Present study is the first reported work on the pharmacognostic standardization of *C. elongatum*. These parameters are markers for identification and preparation of monograph.

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