PHYTOCHEMICAL ANALYSIS OF ETHANOL EXTRACT OF *ACANTHOPHORA DELILEI*USING UV-VIS, FTIR

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ABSTRACT

Objective: The goal of this study was to look into the biologically active compounds in an ethanolic extract of *Acanthophoradelilei.*
Methods: The biologically active compounds were isolated from *Acanthophoradelilei*using ethanol as a solvent and analysed using UV-Visible and FT-IR spectroscopy.
The ethanolic extract of *Acanthophoradelilei*UV-visible spectrum revealed the presence of biologically active compounds with wavelengths ranging from 200 to 800 nm.
Results: The UV-Visible spectra of *Acanthophoradelilei*demonstrated the existence of biologically active compounds in the absorbance range of 200 - 800 nm. With absorption values of 3.997, 0.872, 1.064, 0.164, 0.173, 0.147, 0.192, and 0.174 at nm 228, 382, 407, 503, 541, 595, 669, and 695, the compounds were separated. *Acanthophoradelilei*FT-IR spectrum revealed peaks at 3406.66, 2917.13, 2849.50, 1704.06, 1463.44, 1377.70, 1169.26, 1035.43, and 720.53cm-1, confirming the presence of Alcohols, Alkanes Aliphatic Compounds, Aldehydes, Carboxylic Acids, Alkene Methylene Group, Phenols, Aliphatic Amines and Alkanes.
Conclusions: This research found that *Acanthophoradelilei*could be a source of natural bioactive compounds, and that further isolation could lead to the discovery of a novel biopotential substance with a diverse range of biological activities.

Keywords:*Acanthophoradelilei,* Ethanolic extract, Phytochemical,UV-Visible Spectroscopy, FT-IR.

INTRODUCTION

Recent studies have emphasized on the marine environment, particularly marine algae study. Among all sources, marine sources are the most common and produce high-quality bioactive metabolites.With exception of bacteria, 20,000 substances have been identified from algae and 12,000 from other small members of marine plants, animals, and other sources[1].

Marine macroalgae are a rich source of bioactive substances that can be used in a variety of food, cosmetic, and pharmaceutical products for health improvement. These bioactive substances, such as polyphenols, polysaccharides, carotenoids, and omega-3 fatty acids, have been proved to have bioactivity.

ased on their chemical composition and pigment distribution, marine algae, commonly known as seaweeds, are classified into three groups. Brown algae (Phaeophyta), red algae (Rhodophyta), and green algae (Chlorophyta) are the three kinds of algae. The largest producers of bioactive chemicals, which can be used in the cosmetic, pharmaceutical, and food industries, are red algae[2].

Bioactive chemicals found in marine macroalgae have a wide range of biological actions, including antibacterial, antiviral, antifungal, anticoagulant, anticancer, and anti-inflammatory effects [3].

Algae have been employed as a source of vital components for human nutrition, as well as the cosmetic and pharmaceutical sectors, in various regions of the world owing to their variety of ingredients.They provide high-quality proteins, as they contain all of the essential amino acids; polyunsaturated fatty acids, particularly the omega-3 and other essential fatty acids; carbohydrates; vitamins; minerals (magnesium and calcium); dietary fibres (such as alginates, agar, and carrageenans); and bioactive secondary metabolites (such as phytosterols and polyphenols), among other things [4].

*Acanthophoradelilei*is a type of red seaweed[5].Classification: Phylum: Rhodophyta, Subphylum: Eurhodophytina, Class: Florideophyceae, Subclass: Rhodymeniophycidae, Order: Ceramiales, Family: Rhodomelaceae, Tribe: Chondrieae.

As a result, emphasise the importance of *Acanthophoradelilei*for phytochemical research to detect the presence of biomolecules. With this insight, the current study aimed to determine the phytochemical analysis of *Acanthophoradelilei*using UV-VIS and Fourier transform infrared spectroscopy (FTIR).

Materials and methods

Sample collection

Acanthophoradelilei, a marine red alga collected from the Mandapam intertidal zone in Tamilnadu, India. *Acanthophoradelilei*samples were collected by hand from the sea zone. Then it's transported to the lab in plastic containers holding water to keep it from evaporating. The sample was then extensively cleaned with sea water to remove any foreign contaminants. The samples were dried and ground in an electric mixer at 37°C [6].

Fig 1.*Acanthophoradelilei* (C.Agardh) Grevile

Preparation of Extracts

In a 1-L Soxhlet extractor, 50 g dried and crudely pulverised *Acanthophoradelilei*powder was dumped, ethanol was added, and the solution was heated at 60–70°C during the extraction. The process was repeated until all of the soluble active components were extracted. Then cooled, concentrated using a rotary evaporator at 30–45°C, and kept in sterile screw-capped bottles at 4°C until further use [7].

UV – Visible Spectral analysis

With a (Shimadzu UV1800) UV-Visible double beam spectrometer, the bioactive compound in the crude ethanol extract of *Acanthophoradelilei*was examined. UV-VIS spectrophotometer with wavelengths from 200 to 800 nm. A spectrophotometer was used to examine the peaks, and they were found to be distinct. The characteristic peaks and their absorption values were recorded after scanning the extract of *Acanthophoradelilei*[8].

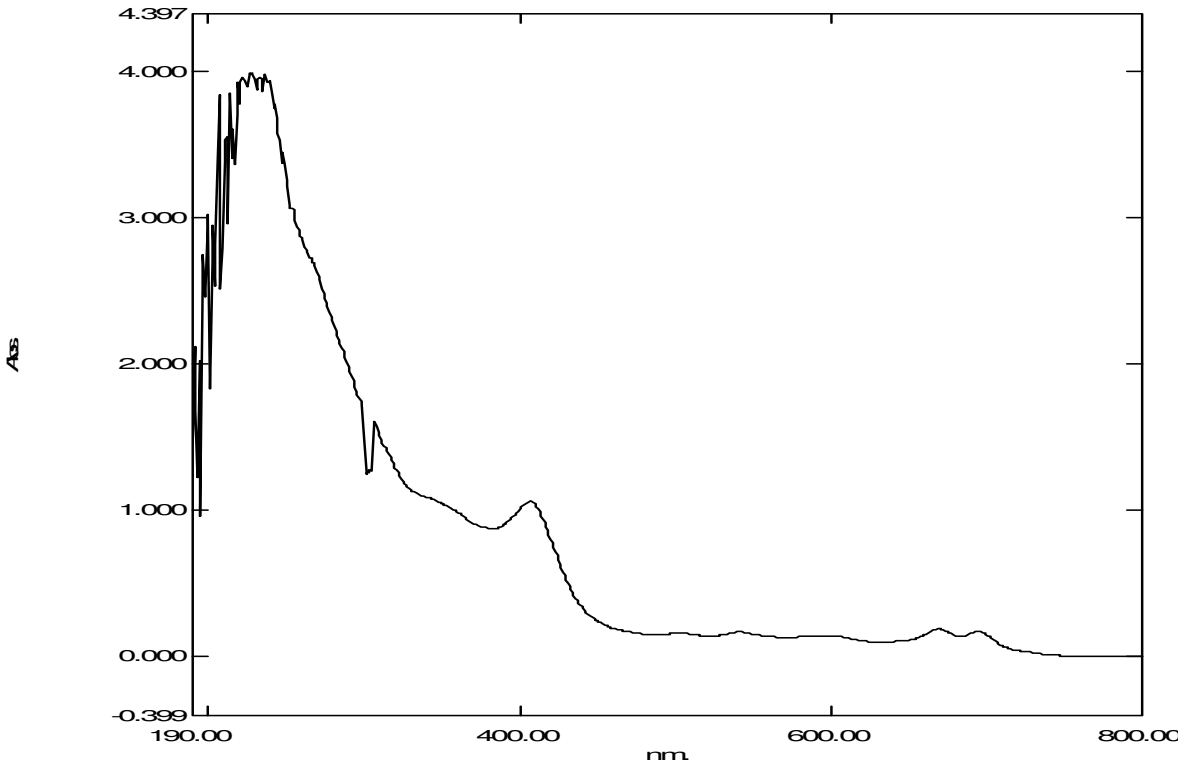

Fig 2: UV-Visible spectrum of ethanolic extract of *Acanthophoradelilei*

FT-IR Analysis

A tiny amount of *Acanthophoradelilei*was correspondingly positioned directly on the sample container of the infrared spectrometer by constant pressure applied on a Perkin Elmer Spectrophotometer system, and data of infrared absorbance, gathered over the wave number ranged from 4000 cm–1 to 400 cm–1, and reference spectra were attained. The FT-IR peak values have been recorded. Each analysis was double-checked to ensure that the spectrum was correct. Peak values for FT-IR have been recorded. Each analysis was double-checked for accuracy[8].

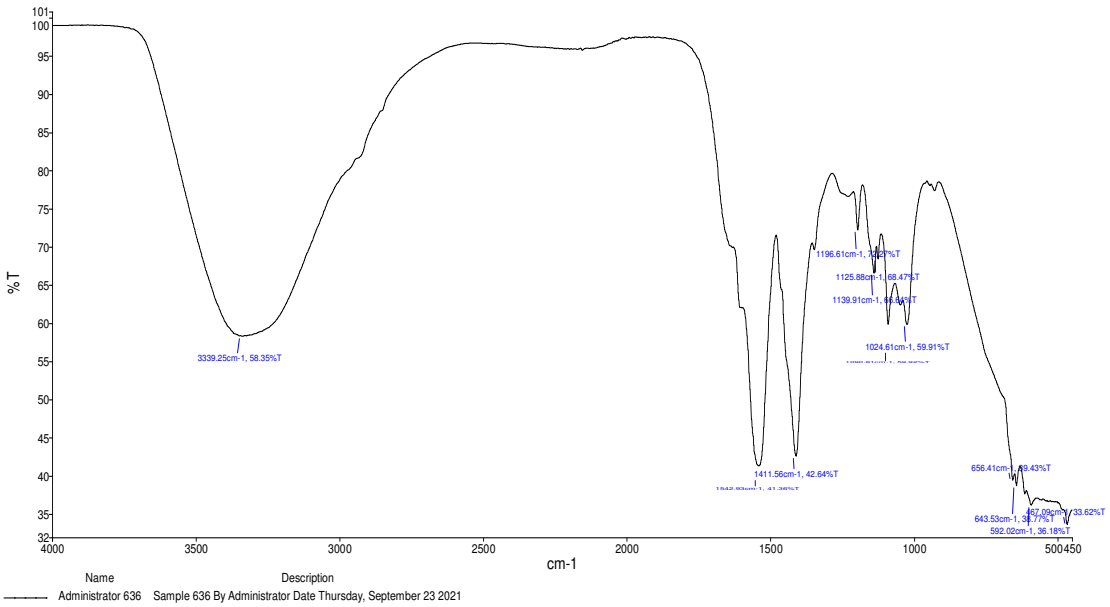

Figure 3: FTIR spectrum of ethanolic extract of *Acanthophoradelilei*.

RESULT AND DISCUSSION

UV visible spectral analysis of sample

At wavelengths ranging from 200 to 800 nm, the UV-Vis spectra of the ethanolic extract *Acanthophoradelilei*were chosen. With absorption values of 3.997, 0.872, 1.064, 0.164, 0.173, 0.147, 0.192, and 0.174 at nm 228, 382, 407, 503, 541, 595, 669, and 695, the compounds were separated (Figure-2 & Table-1).

Table 1: UV Visible spectrum of ethanolic extract of *Acanthophoradelilei*.

Wavelength nm	Abs
228.00	3.997
382.00	0.872
407.00	1.064
503.00	0.164
541.00	0.173
595.00	0.147
669.00	0.192
695.00	0.174

FT-IR Analysis

The Fourier Transmission Infrared Spectroscopy is used to identify the functional group of bioactive components based on their peak value in the infrared spectrum. Based on the peak ratio, the main functional group of the components was isolated from the crude powder of *Acanthophoradelilei*. The peak values of the FTIR spectrum containing functional groups of bioactive components were denoted in (Fig.3 and Table.2). The presence of Alcohols, Alkanes Aliphatic Compounds, Aldehydes, Carboxylic Acids, Alkene Methylene Group, Phenols, Aliphatic Amines, and Alkanes was confirmed by the FT-IR spectra of *Acanthophoradelilei*, which exhibited peaks at 3406.66, 2917.13, 2849.50, 1704.06, 1463.44, 1377.70, 1169.26, 1035.

Table 2. FTIR spectrum of ethanolic extract of *Acanthophoradelilei*.

Peak Value	Spectroscopic Assignments	Functional Group
3406.66	O-H stretch	Alcohol, Phenol hydroxyl group
2917.13	-CH stretch	Alkanes
2849.50	-CH stretch	Alkanes
1704.06	C=O stretch	Aldehydes, Carboxylic acids
1463.44	C–H bending	Alkene methylene group
1377.70	C=H stretch	Alkanes
1169.26	C-O stretch	Carboxylic acid
1035.43	C-N stretch	Aliphatic amines
720.53	C-H Stretch	Alkanes

CONCLUSION

The UV-Visible spectrum, as well as FTIR analysis, can be used to detect phytochemicals, according to the findings of this research. *Acanthophoradelilei*is also said to be one of the greatest sources of phytochemicals, which may be isolated and tested for a variety of biological activities depending on medicinal uses. Future research will focus on isolating and characterising active principles with biopotential.

The main bioactive compounds found in *Acanthophoradelilei*may be used to treat a number of serious illnesses, according to this research. In addition, the pharmaceutical, cosmeceutical, and functional food sectors may be interested in the potential biological activity of a particular bioactive compound.

Conflict of interests

The authors declare there are no conflict of interests.

REFERENCES

1. Alharbi, N. S. Et Al. Screening of Anti-Oxidant and Anti-Bacterial Metabolites from Brown Algae TurbinariaOrnata for Inhibits the Multi-Drug Resistant P. Aeruginosa. Journal Of King Saud University - Science 32, 3447–3453 (2020).
2. Cikoš, A.-M., Jokić, S., Šubarić, D. &Jerković, I. Overview on The Application of Modern Methods for The Extraction of Bioactive Compounds from Marine Macroalgae. Marine Drugs 16, 348 (2018).
3. Shankhadarwar, S. D. Phytochemical Analysis of Red Alga AcanthophoraSpicifera (Vahl) Collected from Mumbai, India. Available Online Www.Jocpr. Com Journal of Chemical and Pharmaceutical Research 7, 441–444 (2015).
4. Pereira, L. Seaweeds as Source of Bioactive Substances and Skin Care Therapy—Cosmeceuticals, Algotheraphy, And Thalassotherapy. Cosmetics 5, 68 (2018).
5. Perrone, C., Cecere, E. &Furnari, G. Growth Pattern Assessment in The Genus Acanthophora (Rhodophyta, Ceramiales). Phycologia 45, 37–43 (2006).
6. Duraikannu, K., Shameem Rani, K., Anithajothi, R., Umagowsalya, G. &Ramakritinan, C. M. IN-VIVO ANTICANCER ACTIVITY OF RED ALGAE (GELIDIELA ACEROSA AND ACANTHOPHORA SPICIFERA). International Journal of Pharmaceutical Sciences and Research 5, 3347 (2014).
7. Taskin, E., Ozturk, M., Taskin, E. & Kurt, O. Antibacterial Activities of Some Marine Algae from The Aegean Sea (Turkey). African Journal of Biotechnology 6, 2746–2751 (2007).
8. Hemalatha, A. Extraction and Isolation ofPhlorotanninsfrom Brown Seaweed TurbinariaOrnata (Turner) J. Agardhand Its Antioxidant Activity. Https://Www.Researchgate.Net/Publication/256483781 (2013).