International Journal of Research in Pharmacy and Pharmaceutical Sciences
www.pharmacyjournal.in
ISSN: 2455-698X
Received: 09-05-2023, Accepted: 22-05-2023, Published: 08-06-2023
Volume 8, Issue 2, 2023, Page No. 160-162

Profile extract alcohol 96% *padina australis* use *Spektroskopi infra red* as quality control of raw material for antibacterial

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Abstract
Padina australis is a Phaeophyta Division (brown algae) marine algae (Franklin *et al*., 2017) [3]. Phaeophyta is a potential source of bioactive chemicals that can be used in the pharmaceutical sector as antioxidants, antibacterial agents, and for a variety of other health advantages (Bachtiar, 2007) [1]. Padina australis is a species native to Sumenep Islands. When a plant is active, it has vital information. One of the methods for evaluating the bioactive substances in these plants is to conduct phytochemical screening tests accompanied by Infrared Spectroscopy profiles, which are profiles of certain functional groups. Padina australis contains flavonoid chemicals, terpenoids, steroids, saponins, tannins, and alkaloids, according to phytochemical test data. The Infrared Spectroscopy profile revealed the presence of eight functional groups: alkanes, amines, O-H carboxylic acids, N-H (cyclic alkenes), C-O (ethers), C=C (aromatic), alkenes, and aromatic rings. Flavonoids, terpenoids, steroids, saponins, tannins, and alkaloids are specific groupings created in the Infrared Spectroscopy profile in each of these chemicals. Aromatic ring and alkene are two characteristics of the Padina australis Infrared Spectroscopy profile. There are two aromatic ring functional groups that are clearly apparent on the Infrared Spectroscopy profile. This is consistent with the findings of phytochemical screening. One of these compounds, fucoidan, is known to be found in Padina australis. Fucoidan possesses particular functional groups that can be seen in the Infrared Spectroscopy profile of Padina australis.

Keywords: alcohol 96%, extract, *Padina* Australis, skrinning, spektroskopi, infrared

Introduction
Infrared spectroscopy (FTIR) is a technique for detecting vibrational characteristics of functional groups of substances in samples by measuring infrared intensity versus wavelengths. (Kang and colleagues, 1998) [5]. Because the spectra can reveal specific functional groups of the plant, infrared spectroscopy (FTIR) can be employed for extract profiling. Furthermore, Infrared Spectroscopy (FTIR) analysis is quick, non-destructive, and only requires simple sample preparation (Vlacos *et al*, 2006), and the sample required is small (0.5 - 1.5 grams).

Padina australis contains secondary metabolite chemicals with antibacterial activity, such as steroids, terpenoids, polyphenols, and saponins (Salosso, 2012) [7]. Both algae have an antibacterial function because they will be used as a foundation for the development of antibacterial medications in the future. Antibacterial acne is one example. Many microorganisms are antibiotic-resistant. Antibiotic resistance in microorganisms is a developing global public health issue. The increasing frequency of resistance events drives the development of novel antibiotics to combat the resistance problem (Nanik, 2014) [6]. Antibacterial microorganisms can be produced later in the drug development process.

Padina australis has the potential to be antibacterial at the aforesaid exposure due to the presence of various secondary metabolites (Saloso, 2012). The content of these substances can be examined in phytochemical screening and then proceeded with an Infrared Spectroscopy profile. If the plant has these substances, all components in the plant will appear with good findings in phytochemical screening. As a sort of quality control, an infrared spectroscopic profile is used to see the specific functional groups held by chemicals found in the plant. Quality control occurs at the start of the process, throughout the process, and at the completion of the process. The selection of plant raw materials can serve as the first stage of the quality control process (Farizah & Yuyun, 2022) [2]. Because 96% alcohol is a volatile polar molecule, it is appropriate for use as an extracting solvent. Infrared Spectroscopic Profile generates precise functional group data, which can then be utilized to determine the content or substances present in it. The compound composition of Padina Australis was investigated using phytochemical screening and a technique based on infrared spectroscopy.

Material and Methods
Material
Padina australis from sumenep island, aquadest, alcohol 96%, $FeCl_3$,Mg powder, HCl Concentrated, Reagents Dragendroff, Mayer, Acetic acid anhydride, H_2SO_4, and Reagent Liberman Buchard

Methods
Phytochemical Screening test: 3 g sample extract, reagent, and opinions The sample extract is then subjected to multiple operations and observed for color changes, precipitation, or other phenomena as directed by the process. Table 1. Infrared spectroscopy profile analysis, take samples of 0.5-1.5 mg of chemicals inserted into the sample holder, then scan using Infrared spectroscopy.

Tabel 1: Phytochemical Screening Test Method

Test	Description	Result
Tanin	A small amount of the extract is mixed with 10mL of aquades before being heated to a boil. A few drops of FeCl3 are added. The presence of tannin compounds is indicated by the presence of brownish-green or bluish-black color.	+ percipited
Saponin	10mL aquades are mixed with a little amount of extract and violently shaken for 30 seconds. Saponin compounds are indicated by the presence of stable foam.	+ Bubble
Flavonoid Alkaloid	A small amount of extract is blended with Mg powder and a few drops of pure HCL. The presence of pink, magenta, and orange suggests the presence of flavonoid molecules. A small amount of sample extract is mixed with 1% HCl before adding 1mL of Mayer reagent. The presence of precipitate or turbidity suggests the presence of an alkaloid compound.	+ Reddish orange + percipited
Steroid	A small amount of extract is mixed with a small amount of anhydrous acetate and one drop of H2SO4 (Liberman Buchard reagent). A greenish-blue tint indicates the presence of a steroid molecule.	+ red ring
Terpenoid	A small amount of extract is mixed with a small amount of anhydrous acetate and 1 drop (Liberman Buchard reagent). The presence of a brownish-red or brownish-pink ring suggests the existence of a terpene component.	+ Reddish Brown

Conclusion

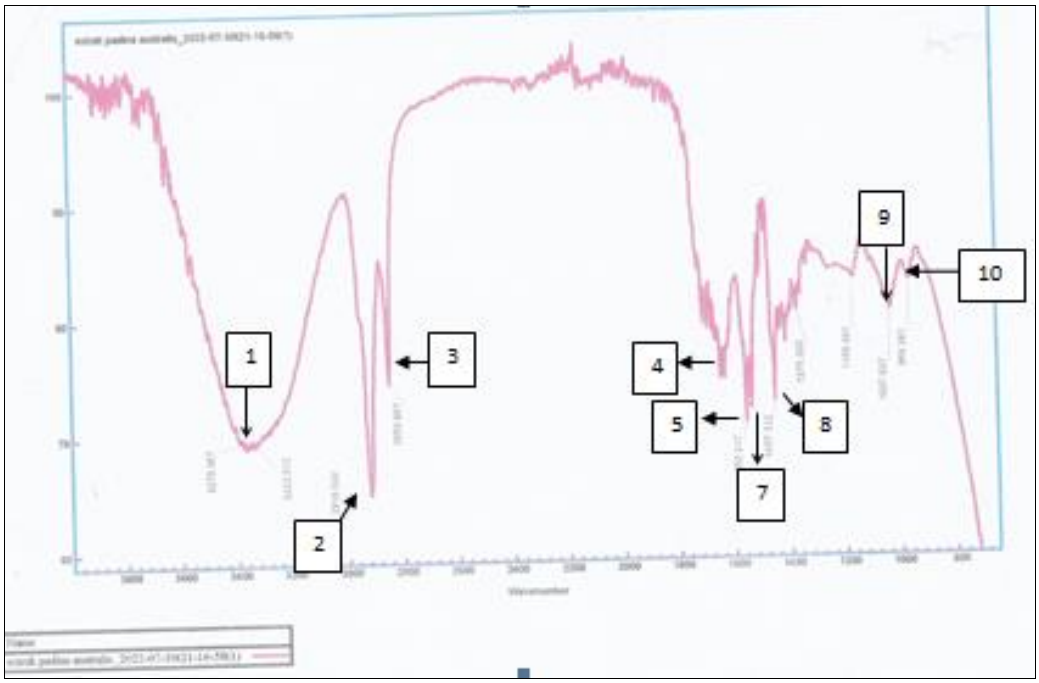
Padina australis phytochemical screening

Phytochemical screening was performed in this study to determine which compounds are present in Padina australis. It is known that a plant has metabolites of both secondary metabolites and primary metabolites. In this case, we will look at the secondary metabolites contained in Padina australis. Other research results show Padina australis contains steroid compounds, terpenoids, polyphenols, and saponins that have the potential to be antibacterial (Salosso, 2012; Nani *et al* 2020) [6, 7].

Padina australis brown seaweed extract from Sumenep Island was discovered to include flavonoids, terpenoids, steroids, saponins, tannins, and alkaloids. These findings are consistent with previous studies conducted by other researchers. One of the advantages of this content is that it is antibacterial.

Spectrophotometry InfraRed Padina australis Alkohol 96%

The profile of Padina australis 96% Alcohol extract was shown using Infrared Spectrophotometry by looking at the specific functional groups contained in it. The specific functional group will later reveal what compounds are contained within it, whether or not the functional group reveals a class of compounds, such as phytochemical screening results. The results of phytochemical screening reveal several classes of compounds, which will later be confirmed by Infrared Spectrophotometry.



Gambar 1: Spektrofotometri InfraRed Padina australis Alkohol 96%

Figure 1 shows an example. The infrared spectrophotometry of Padina australis plants appears to be similar to fucoidan infrared spectrophotometry. Fucoidan is a type of flavonoid. The findings of phytochemical screening suggest that + flavonoids. This means that the phytochemical screening results are consistent with the Infrared Spectrophotometry results. Flavonoids function as antibacterial by forming complex compounds against extracellular proteins that disrupt the integrity of bacterial cell membranes (Juliantina *et al.*, 2009) [4]. Fucoidan's structure is made up of carboxylic acid functional groups such as COOH, C-O (ether), C=C (aromatic), alkenes, and aromatic rings. Table 3 reveals the presence of eight functional groups, namely alkanes, amines, O-H carboxylic acids, N-H (cyclic alkenes), C-O (ether), C = C (aromatics), alkenes, and aromatic rings, in the results of the Infrared Spectroscopy profile.

Table 3: Data Spektrofotometri InfraRed Padina australis Alkohol 96%

No	Wavenumber (cm^{-1})	Functional groups	Intensity
1	3379	carboxylic acids	Broad
2	2916	Alkane	Strong
3	2850	Alkane	Strong
4	1640	cyclic alkenes	Medium
5	1558	aromatic ring	Medium
6	1520	aromatic ring	Medium
7	1457	Concurrent 2 C aromatic	Strong
8	1169	Amine	Weak
9	1037	Ether	Weak
10	968	Alkenes	Weak

According to the findings, the specific functional groups created indicated that the composition of Padina australis was fucoidan. This is supported by phytochemical screening data in which the resulting compound is one of the fucoida compounds.

Acknowledgments
Thank you to the Pharmacy Study Program, Faculty of Medicine, Hang Tuah University, Surabaya, for your assistance and moral support.

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