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Photochemical Tests on Leaves of Kapundung (*Baccaurea Racemosa* Muell.Arg)

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ABSTRACT

The Kapundung plant (*Baccaurea Racemosa*) has been used for traditional treatments, such as constipation, eye swelling, arthritis, abscesses, abdominal pain, and facilitating menstruation and urination. This study aimed to examine the flavonoids, tannins, phenolics, saponins, and alkaloids in Kapundung Leaves. This research is a qualitative-experimental approach carried out using the maceration method and then identifying the chemical content of Kapundung leaves using phytochemical analysis tests in the Institut Teknologi dan Kesehatan Sumatera Utara laboratory. The results of the phytochemical test of flavonoid compounds (marked by black color) were carried out by adding a solution of $FeCl_3$1%; alkaloids (marked by black color) were carried out by adding HCl and Wagner's reagent; saponins (marked by the emergence of stable foam for 15 min) were carried out by adding distilled water, which was shaken vigorously and then allowed to stand for 15 min; tannins (marked by a blackish green color) were carried out with the addition of $FeCl_3$, and phenolics (marked by black color) were carried out by adding distilled water and $FeCl_3$ solution. Flavonoids are widely used in the pharmaceutical sector as antioxidants, tannins as antidiarrheals, saponins as foaming agents in shampoos, phenolics as antioxidants, and alkaloids as analgesics.

Keywords: *Kapundung plant, flavonoids, tannins, phenols, saponins, and alkalooid*

I. INTRODUCTION

Indonesia has a relatively large forest area that, includes many species of medicinal plants. Medicinal plants contain ingredients that are used for treatment. Approximately 143 million hectares of tropical forests in Indonesia contain 80% medicinal plants from 28,000 plant species worldwide. A total of 1,000 plant species have been used in medicine.

One of the plants used as medicine is the Kapundung plant (Baccaurea Racemosa), which is used for traditional treatments such as constipation, eye swelling, arthritis, abscesses, abdominal pain, and facilities of menstruation and urination. There are many chemical compounds in Kapundung Leaves (Baccaurea Racemosa); therefore, Kapundung Leaves (Baccaurea Racemosa) can be used for several treatments of various diseases. Proving the content of these compounds can be done by phytochemical tests.

A phytochemical test is an examination of the class of compounds contained in plant simplicia. This test can be used to prove the presence or absence of certain chemical compounds in plants that are

associated with biological activity. Phytochemical tests are performed based on a reaction that produces a color or precipitate. Phytochemical testing was performed to identify the active compounds contained in the plants. In this study, the test was performed by taking a small sample of the macerated extract and, adding reagents according to the compounds to be identified. Over the years, simple color tests and drop reactions have been developed to indicate the presence of a particular compound or group owing to its proven characteristics and pH level. Phytochemical tests can be used to identify alkaloids, tannins, phenolics, saponins, flavonoids, terpenoids, and steroids. However, in this study, phytochemical tests were performed only to identify flavonoids, alkaloids, saponins, tannins, and phenolics.

The maceration method was used for the extraction. Maceration is a method that involves immersing the material in a solvent and gradually stirring it one at a time at room temperature. This process is helpful in the isolation of natural compound compounds because, by immersion, there is cell wall and membrane breakdown in plant samples due to the pressure differences between the inside and outside of the cell. This causes the secondary metabolites in the cytoplasm to dissolve in organic solvents, and the extraction of compounds that occur is perfect because of the adjustable immersion time.

II. RESEARCH METHODS

This study was conducted from February to March 2021. This study was conducted at the Pharmacy Laboratory of the Institut Teknologi dan Kesehatan Sumatera Utara.

The tools used in this study were a blender, horn spoon, glass jar, glass beaker, tripod, porcelain cup, Bunsen, measuring cup, analytical scale, and a spatula.

The materials used in this study were Kepundung Leaves (Baccaurea Racemosa), 96% ethanol, 1% FeCl3, 0.1N HCl, aquades, and Wagner's reagent.

1. Extraction of Kepundung Leaves (Baccaurea Racemosa) by Maceration Method

The Kapundung leaf (Baccaurea Racemosa) sample to be extracted was macerated, by soaking the sample powder in 96% ethanol solvent (comparison of Simplicia volume: solvent = 1:4) and allowed to stand at room temperature for 48 h. The comparison of Kapundung leaves powder (Baccaurea Racemosa) in this study was 100 grams of Kapundung leaves powder (Baccaurea Racemosa) soaked in 400 mL of 96% ethanol.

2. Identification of Chemical Content

a. Flavonoid Test

Kapundung leaf (2 mL: Baccaurea Racemosa) filtrate was added to 5 mL of ethanol and three drops of 1% FeCl3 solution until a color change occurred. The flavonoid content was indicated by a change from green to black.

b. Alkaloid Test

Kapundung leaf (2 mL; Baccaurea Racemosa) filtrate was added to 1 mL of HCl and heated for 2 min with continuous stirring. The mixture of Kapundung leaf extract (Baccaurea Racemosa) and 0.1 N HCl after cooling. 1 mL of 0.1 N HCl was added to the filtrate and three drops of Wagner's reagent were added. A change indicates the alkaloid content from green to brownish-yellow.

c. Saponin Test

Kapundung leaf (2 mL; Baccaurea Racemosa) filtrate was added to 5 mL of distilled water and shaken vigorously. Then, it was allowed to stand for 15 min. The formation of a stable foam indicated a positive test for the presence of saponins in the solution for 15 min.

d. Tanin Test

Kapundung Leaves (Baccaurea Racemosa) (2 mL) were boiled in 4 mL of distilled water in a test tube. Filter and add three drops of a 1% FeCl3 solution. Positive results for tannins are indicated by a change from green to brownish-green.

e. Phenol Test

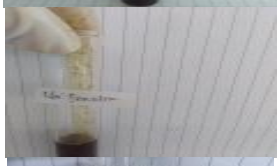
Two milliliters of Kapundung leaf (Baccaurea Racemosa) filtrate plus 2 mL of distilled water was added, and three drops of FeCl31% solution were added until the color changed. The phenol content was indicated by a change from green to black.

III. RESULTS AND DISCUSSION

a. Extraction of Kepundung Leaves (Baccaurea Racemosa)

The production of Kapundung leaf extract (Baccaurea Racemosa) begins by washing Kapundung leaves thoroughly with running water to remove soil and dirt attached to the Simplicia. The leaves were then chopped to increases drying time. The leaves were then dried in a drying cabinet for three days to reduce the moisture content of the simplicia. The dried Kapundung (Baccaurea Racemosa) leaves were crushed using a blender and, then sieved to obtain the appropriate particle size according to sieve number 40. One hundred grams of crushed Kapundung Leaves (Baccaurea Racemosa) was dissolved in 400 ml of 96% ethanol and filtered using filter paper.

Tabel 1 Phytochemical test results of Kapundung Leaves *(Baccaurea racemosa Muell,Arg)*Extract

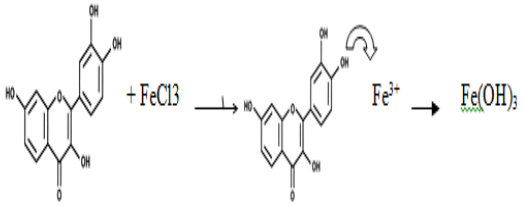
Compound	Reagent	Description	Colour
Flavanoid	**$FeCl_3$1% Solution**	**Black (positive)**	
Alkaloid	**HCl and Wagner's Reagent**	**Black (negative)**	
Saponin	**Distilled Water**	**Stable foam formation (positive)**	
Tannin	**$FeCl_3$1% Solution**	**Black-greenish (positive)**	
Phenolic	**$FeCl_3$1% Solution**	**Black (positive)**	

Phytochemical tests were then carried out to determine the content of flavonoids, tannins, phenolics, saponins, and alkaloids in Kapundung Leaves (*Baccaurea* racemosa Muell.Arg). This test was carried out to determine the content of phytochemical compounds present in the leaves of kapundung (Baccaurea racemosa Muell.Arg). Tests with positive results will be helpful for further testing as raw materials for

drugs in the pharmaceutical field. Based on the results of the phytochemical test of Kapundung Leaves (Baccaurea racemosa Muell.Arg), the data obtained in the table above.

b. Flavanoid Test

Kapundung leaf filtrate (Baccaurea Racemosa), which was put into a test tube, three drops of $FeCl_3$1% solution produced a black color indicating the presence of flavonoid compounds, where FeC_{l3}1% added to Kapundung leaf filtrate (Baccaurea Racemosa) will form a complex compound between Fe3+ ions and OH- to form a black solution.

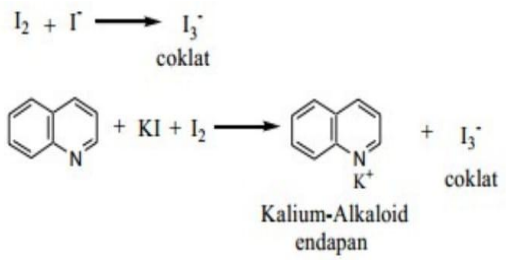


The reaction of flavonoids with 1% FeCl3 results the formation of a black color, where Fe3+ ions bind to OH- to form complex compounds and produce black Fe $(OH)_3$.

Flavonoids are widely used in the pharmaceutical field as antioxidants that protect cells from excessive free radical damage, which can cause several diseases, such as heart disease, and nerves.

c. Alkaloid Test

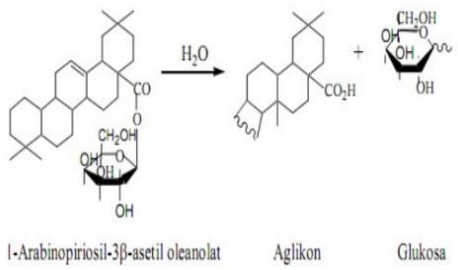
Kapundung leaf (Baccaurea Racemosa) filtrate was put into a test tube, and then 1 ml of HCl and three drops of Wagner's reagent solution (consisting of iodine and potassium iodide), produced a black color that indicated no alkaloid compounds. Wagner's reagent was added to the filtrate of Kapundung Leaves (Baccaurea Racemosa), where the I-2 and KI ions did not react, and I-3 did not produce a brownish color.



In the pharmaceutical field, analgesics serve to reduce pain and inflammation.

d. Saponin Test

Kapundung leaf (Baccaurea Racemosa) filtrate was placed a test tube, 5 ml of distilled water was added, and youtube the tube was shaken vigorously. After being allowed to stand for 15 min, it produces a stable foam, indicating the presence of saponin compounds, where the distilled water added to the Kapundung leaf (Baccaurea Racemosa) filtrate was hydrolyzed to form a stable foam.

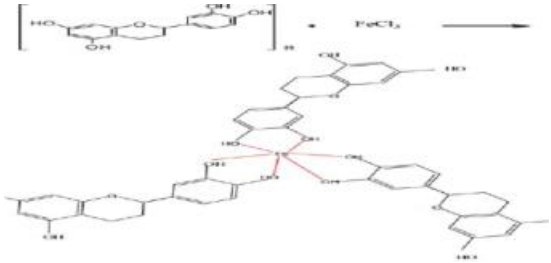


Based on the hydrolysis reaction of saponins with water, it can be explained that the appearance of foam indicates the presence of glycosides that can form foam in water which is hydrolyzed to glucose.

Saponins are widely used in the pharmaceutical sector as foaming agents in shampoos and detergents in the textile industry.

e. Tannin Test

Kapundung leaf (Baccaurea Racemosa) filtrate, which was put into a test tube, three drops of FeCl31% solution produced a black color indicating the presence of flavonoid compounds, where FeCl31% added to Kapundung leaf filtrate (Baccaurea Racemosa) formed a complex compound between Fe3+ ions and OH- to form a black solution.

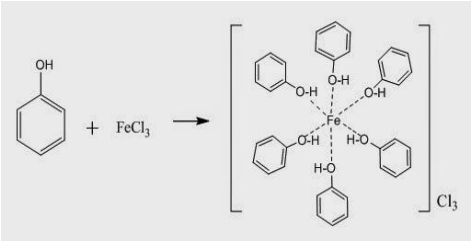


Based on the above reaction, tannins with 1% FeCl3 showed a brownish-green color. Fe3+ ions with OH-form complex compounds and produce a blackish-green Fe (OH)3 compound.

Tannins are widely used in the pharmaceutical field as antidiarrheals, which treat diarrheal diseases caused by bacteria, viruses, or food poisoning.

f. Phenolic Test

Kapundung leaf (Baccaurea Racemosa) filtrate was put into a test tube, and three drops of FeCl31% solution were added, which produced a black color indicating the presence of flavonoid compounds. FeCl31% added to the filtrate of Kapundung leaves (Baccaurea Racemosa) will forms a complex between Fe3+ ions and OH-format a black solution. The black solution in the test solution was identified as positive for phenolic compounds.



Based on the above reaction, where FeCl3 is a black, Fe3+ ions bind to OH forming a complex compound and producing a black Fe (OH)3 compound.

Phenolics are widely used in the pharmaceutical field as antioxidants that function to ward off free radicals, and natural antioxidants such as vitamin A contained in phenolic compounds are widely used to reduce acne, which is found in beauty products.

IV. CONCLUSION

From the results of research conducted on the filtrate of Kapundung Leaves (Baccaurea Racemosa), the flavonoid test formed a black color (positive), alkaloid test formed a black color (negative), saponin test form a stable foam (positive), tannin test formed a brownish-green color (positive), and phenolic test formed a brownish-black color (positive).

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