

Phytochemical Screening of Noni (*Morinda citrifolia* L) Leaf Ethanol Extract in Pejagan Village, Bangkalan Regency

Fitroh Annisaul Mubarokah^{1*}, Winda Yuliasari², Teguh Setiawan Wibowo³

^{1,2}Akademi Farmasi Yannas Husada Bangkalan

³STIE Mahardhika Surabaya

Corresponding Author: Fitroh Annisaul Mubarokah fitroh.annisaul@gmail.com

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ABSTRACT

Indonesia has a very high amount of biodiversity. This is evidenced by the many types of medicinal plants that grow in this country. Noni fruit is one of the most popular medicinal plants in Indonesia and has high efficacy. However, the utilization of noni leaves is still not maximal. This study aimed to test for the presence of secondary metabolites in the ethanol extract of noni leaves using phytochemical screening. The results showed that the ethanol extract of noni leaves from Pejagan village positively contained alkaloids, terpenoids, steroids, flavonoids, tannins, and saponins.

INTRODUCTION

Noni is one of the most popular medicinal plants in Indonesia, due to its many properties for treating disease and maintaining a healthy body. Noni is commonly referred to as Pace, and almost all parts of this pace plant can be utilized, starting from the roots, seeds, fruit, and leaves.

Noni leaves are useful as a wound healer or inflammation, as a treatment, or as an analgesic, have anti-inflammatory properties against cancer, improve blood flow, and antioxidants to fight free radicals that can damage the skin.^{1,2}

Based on several studies, noni plant parts contain active compounds, namely alkaloids, flavonoids, triterpenoids, tannins, saponins, and anthraquinones. Phytochemical screening is a method used to determine the presence or absence of active compounds contained in plant extracts. This test is carried out using a color reagent that works specifically. The color change determine the active compound contained.³

Phytochemical screening was carried out on viscous extracts from the extracted samples. There are several methods of extracting a natural substance. One of the simplest and most widely used extraction methods is maceration. This is because this method can avoid damage to thermolabile compounds. After all, it does not use heating, but maceration requires a lot of solvent and takes a long time.

Many studies have been carried out on phytochemical screening to determine the presence or absence of active compounds in noni leaves. However, the content of active compounds or secondary metabolites in each region may differ even though the plant species are the same. This is due to geographical factors such as growing area, soil, water content, and others that can affect it.⁴ Therefore, researchers conducted a study to determine the presence or absence of secondary metabolites in noni leaves from Pejagan Village, Bangkalan Regency.

LITERATURE REVIEW

Noni (*Morinda citrifolia* L.) is a tropical plant that has been used as food and herbal medicine. Noni (*Morinda citrifolia* L.) became widely known since 2000 years ago. Noni (*Morinda citrifolia* L.) is known to have many benefits for human health. The effects of noni leaves include antioxidant (immune), analgesic (pain), anti-inflammatory (inflammation), and xanthine oxidase inhibitor activity. Noni can also reduce blood pressure and vasodilate blood vessels.

Extraction is a process of separating a substance from a mixture using an appropriate solvent. Maceration is an example of a gradual solid-liquid extraction method that is carried out by letting the solids soak in a solvent. The immersion process to extract a substance from natural materials can be carried out without heating (at room temperature), by heating, or even at boiling temperature.

Phytochemical screening is method used to determine whether or not content of chemical compounds or active ingredients in a plant extract. The way to do a phytochemical screening is to use a detection reagent specific class of compounds such as flavonoids, alkaloids, tannins, saponins, terpenoids, and

others. The changes that occur after adding the reagent to the extract to be tested will be determine the content of that compound contained in plant extracts.

METHODOLOGY

The research was conducted at the Yannas Husada Pharmacy Academy Laboratory in Bangkalan for 6 months, from March 2023 to July 2023. This research involved lecturers as lead researchers and students as research assistants. The research timeline is shown in the Table 1.

The tools used in this study were laboratory glassware, hot plates, analytical balances, water baths, thermometers, water baths, evaporating cups, blenders, sieves, and maceration containers. The materials used in this study were noni leaves (from pejagan), distilled water, ethanol, dragendrof reagent, Meyer reagent, Lieberman burchard reagent, 1% FeCl₃, 0.1 N HCl, concentrated H₂SO₄.

Table 1. Research Timeline

No	Time line	Details of activities
1	March 2023	develop a research plan and sample collection
2	March 2023	Determination, Determination of sample (noni leaf) water content, Sample preparation
3	April-June 2023	Extract Preparation, Phytochemical Screening, and Result Analysis
4	July 2023	Literature review and Article Preparation

The research began with collecting raw materials or samples, namely researchers collecting 1 kg of noni leaves from Pejagan Village. Sample preparation was carried out by performing wet sorting, washing, chopping, drying, dry sorting, and then grinding and sifting. Then it was macerated using ethanol solvent for 3 days, where stirring was done every 3 hours. Then the maceration results were filtered and concentrated using a water bath to obtain a thick extract of noni leaves. Then weighed to calculate the yield. The ethanol extract of noni leaves is analyzed sufficiently for phytochemical screening, as follows:

- a. Alkaloid test, using Meyer and Dragondroff reagents
- b. Flavonoid test, using magnesium powder and concentrated HCl
- c. Test for Terpenoids and Steroids, where the extract is added with Lieberman burchard reagent
- d. Tannin test, the extract was dripped with FeCl₃
- e. Saponin test, where the extract is added with aquadest, boiled, and shaken.

RESULTS AND DISCUSSION

The research was conducted at the Bangkalan Academy of Pharmacy Laboratory. Research documentation is shown in Figure 1



Figure 1. Research Documentation

The results of plant identification showed that the leaves were noni leaves (*Morinda citrifolia* L). The simplicia characterization results showed that the wet weight of the simplicia was 1 kg, and after drying it shrank to 256 grams, then after being powdered it became 202 grams. As for the results of the plant morphology examination, it was found that noni leaves are dark green in color and bitter taste. Noni leaf was extract by universal solvent, 96% ethanol with maceration method. The results of the maceration of noni leaves are presented in Table 2.

Table 2. The Results of Maceration

Sample Powder	Ethanol Ectract	% yield	Organoleptic
202 gram	22 gram	10,89 %	Dark Green viscous extract, sticky, sour taste, and distinctive smell.

Phytochemical screening using ethanol extract of noni leaf to know content of secondary metabolites like alkaloids, flavonoids, terpenoids, tannins, and saponins. The results of Noni Leaf Extract Phytochemical Screening are presented in Table 3.

Table 3. The Results of noni leaf phytochemical screening

Test	Noni Leaf	
	Hasil	Keterangan
Alkaloids (Mayer)	+	Precipitate yellowish white
Alkaloids (Dragendrof)	+	brownish orange precipitate
flavonoids	+	Brick red
terpenoids	+	Red
tannins	+	Dark green
saponins	+	frothy

Based on the results of the research that the extract of noni leaves positive alkaloid compounds. This is in line with previous studies which stated that the presence of alkaloids in noni leaves was indicated by the presence of a yellowish-white precipitate.

In this study, the results of testing for flavonoids and tannins tested positive in noni leaf extract following Afiff's research (2017). Flavonoids and tannins belong to the phenolic group which are polar and have an aromatic ring and Tannins are a class of polyphenolic compounds consisting of a benzene ring bonded to a hydroxyl group. Tannins can act as antimicrobials and antioxidants to heal wounds on the skin. While flavonoids are compounds that can inactivate free radicals so that they are antioxidants.

Several previous researchers also found the presence of terpenoids and saponins in noni leaf extract. This is following the results of research conducted by researchers, namely the terpenoid test on the noni leaves ethanol extract were positive. Terpenoid compounds can promote fibroblasts which will synthesize collagen and will support the structure of areas undergoing wound healing processes.

The content of saponins in the ethanol extract of noni leaves conducted by researchers was positive, and these results are following research (Margareta, 2019; Parida, 2022; Afif 2018). Saponins are a type of glycosides that are bound to aglycones, act as an antiseptic, and stimulate collagen production.

The existence of various kinds of active ingredients in noni leaves results in the many benefits of these leaves. Noni leaves have benefits as anti-diarrheal drugs, natural antibiotics, anti-inflammatories, and antioxidants.

Antidiarrheal drugs that are well known in the community are drugs from noni leaves. This is because noni leaves have many active compounds. The presence of tannin compounds in noni can shrink the mucous membranes so that more water absorption will be absorbed and also slow down the process of defecation because tannins are astringent. In addition, the presence of flavonoid compounds in noni leaves can inhibit intestinal motility thereby reducing the secretion of fluids and electrolytes.

CONCLUSIONS AND RECOMMENDATIONS

Maceration of noni leaf using ethanol solvent has a yield of 10.89%. The results of the phytochemical screening on the ethanol extract of noni leaves showed positive noni leaves containing alkaloids, flavonoids, tannins, terpenoids, and saponins. Future research is expected to be able to analyze the active compounds contained in noni leaves using TLC, and can be continued using modern tools to determine the levels of each active compound.

ADVANCED RESEARCH

It is necessary to carry out thin layer chromatography (TLC) and quantitative test studies on the content of secondary metabolites from mengkudu or noni (*Morinda citrifolia*).

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