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LITERATURE STUDY OF THE BENEFITS OF NONI-FRUIT (Morinda citrifolia) AS AN ANTIMICROBIAL

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ABSTRACT

Herbal plants that can be used as antimicrobials are noni fruit (Morinda citrifolia). The fruit contains saponins, flavonoids, essential oils, and alkaloids, which have potential as antimicrobials (Antara, 2014). The type of research used is a literature study review. The study literature review is a summary obtained from a reading source such as books, scientific journals, and other media publications relating to the discussion of research to answer questions or existing problems. A literature search was performed on electronic sources such as Google Scholar, PubMed, and Garuda Portal which have met the inclusion and exclusion criteria. Based on search results by entering the word the key obtained as many as 906 articles and only 3 articles that meet the requirements. The results of the research can be concluded that noni fruit can be used as an antimicrobial and phytochemical compound in noni fruit potential as antimicrobials are flavonoids, saponins, essential oils, terpenoids, alkaloids, scopoletin, ascorbic acid, beta carotene, l-arginine, and proxeronine.

Keywords: *noni fruit, antimicrobial*

INTRODUCTION

In modern times, everyone is required to always be active in working and achieving. Therefore, health is essential and is a valuable thing to maintain, because without good health it will be difficult for every human being to carry out daily activities (Liyanto, 2022). According to WHO, health is defined as a state of health, both physically, mentally, spiritually, and socially, which enables everyone to live a socially and economically productive life (WHO, 2023). Various factors can affect body health, one of which is attack by microorganisms such as bacteria, viruses, fungi, and various other pathogens. Microorganisms can cause various diseases in humans, animals, and plants (Djuramang, et al., 2017). Therefore, efforts need to be made to protect the body from being easily attacked by various microorganisms attacks so that the body is not easily infected with disease.

Antimicrobials are drugs that kill microorganisms. This antimicrobial compound can inhibit the growth of microorganisms, namely inhibiting cell wall synthesis, damaging the plasma membrane, inhibiting protein synthesis, inhibiting nucleic acid synthesis, and inhibiting essential metabolites. (Djuramang, et al., 2017). Antimicrobials can be obtained from synthetic drugs or herbal medicines. However, drug use Synthetics can cause side effects in the form of toxicity to organs (kidneys and liver), hypertension, digestive disorders, and others (Gayatri, 2021). For this reason, the use of herbal medicines as antimicrobials is starting to gain interest because they are considered safer. Currently, around 75-80% of herbal medicines are used in developing countries as a mainstay of treatment. This is based on the public's belief that herbal medicines have advantages compared to synthetic medicines, for example, herbal medicines do not contain side effects, are very affordable, and are available

locally (Prayitno, 2021). One type of herbal medicinal plant that can be used as an antimicrobial is noni (Morinda citrifolia.).

Noni (Morinda citrifolia) is one of the herbal plants that is abundant and easy to find in Indonesia. This plant can be used from leaves, fruit, and seeds (Hardani, 2020). The fruit contains saponins, flavonoids, essential oils, and alkaloids, this allows noni to be one of the plants used as an antimicrobial (Muhammad, 2008).

Based on the description above, the researcher intends to conduct a literature study regarding the use of noni fruit (Morinda citrifolia) as an antimicrobial. According to the author's direct observations in various scientific publication media, there have been no research results that have conducted literature studies regarding the benefits of noni fruit (Morinda citrifolia) as an antimicrobial, therefore this research needs to be carried out. Apart from that, this research can also be a reference for the latest database regarding the benefits of noni fruit as an antimicrobial.

METHODS

The type of research used is a literature review study. A literature review study is a summary obtained from a reading source such as a book, scientific journal, or other publication media related to the research topic to answer existing questions or problems. Study Literature reviews have several purposes, namely as an estimate of the success of a research, and as connecting research with scientific databases, especially regarding the topic being researched (Ridwan, 2021).

Literature Search Strategy Literature searches were carried out on electronic sources such as Google Scholar, PubMed, and Garuda Portal (Hayati, 2020). In the literature search, keywords were used to make the search easier, then the search results were screened or filtered the data according to the inclusion and exclusion criteria.

The database used in this research is secondary data obtained not from direct observation, but obtained from the results of relevant previous research. The secondary data sources in question are scientific reports or journals obtained from Google Scholar, PubMed, and the Garuda Portal.

The keywords used are "Nori fruit as antimicrobial", "Morinda citrifolia to antimicrobial", "Morinda citrifolia" "Antimicrobial", "Nori fruit"

Inclusion and Exclusion Criteria

a. Inclusion criteria are criteria by which research subjects can represent research samples that meet the requirements as samples (Arshinta, 2017). Inclusion criteria in this study include:
   1) Studies that focus on the benefits of noni fruit (Morinda citrifolia) as an antimicrobial
   2) Year of publication in the last 5 years (2016-2021)
   3) Journal in Indonesian and English
   4) Full-text journal
   5) Using an experimental design.

b. Exclusion criteria, research subjects do not represent research samples that can qualify as samples (Arshinta, 2017), include:
   1) Unrelated studies regarding the benefits of noni fruit (Morinda citrifolia) as an antimicrobial
   2) Publication year 2016 or below
   3) The journal is not in Indonesian and English
   4) The journal does not use an experimental design.

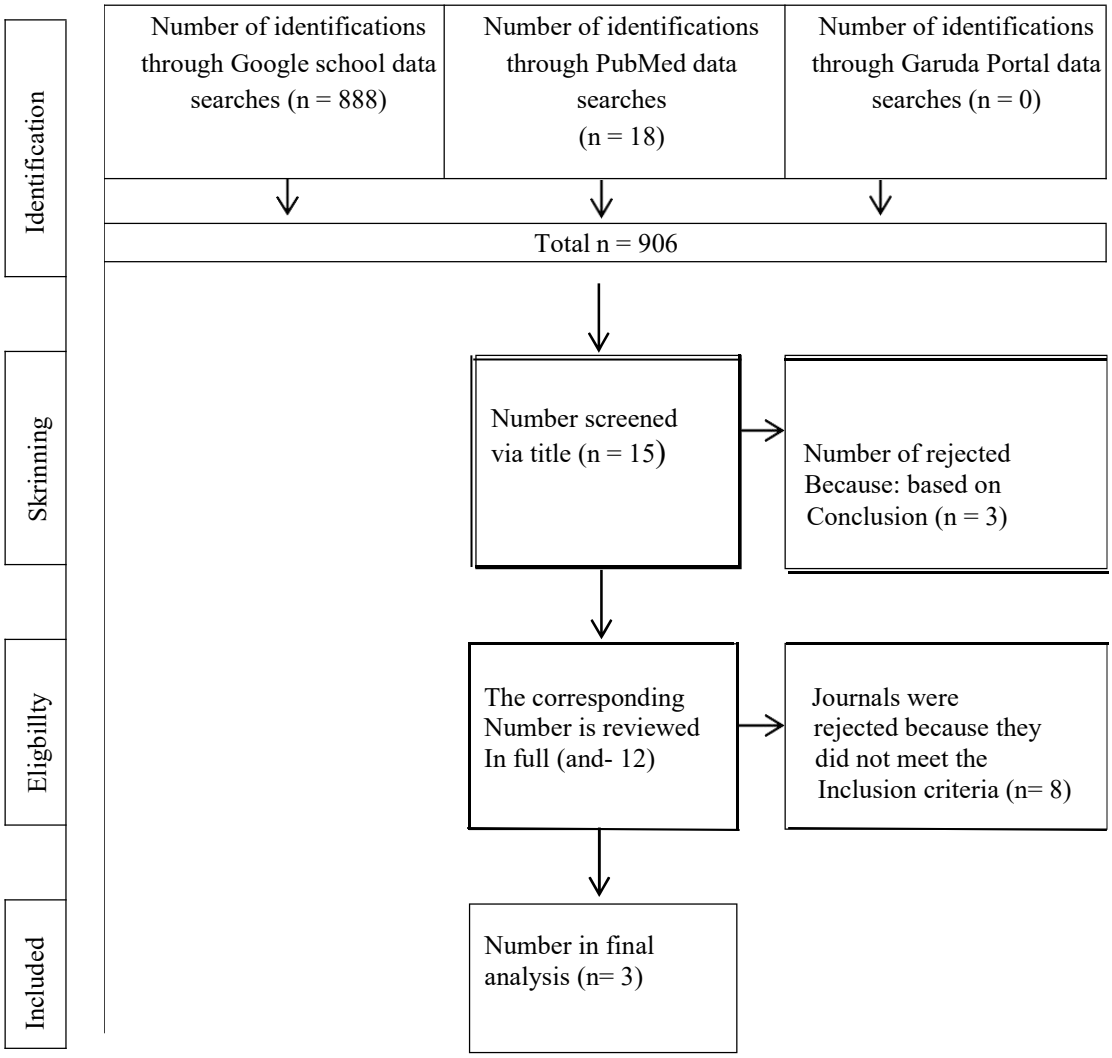
Research time

The research period for literature studies is the benefits of noni fruit (Morinda citrifolia) as an antimicrobial in 2023 - 2024.

Sample

The sample is a portion of the population selected in a certain way to represent the entire population group (Amin, 2023). The sample used in this research was a scientific journal that corresponded to the topic, namely the benefits of noni fruit (Morinda citrifolia) as an antimicrobial which met the inclusion and exclusion criteria.

Search Journal



Research variable

Research variables are variations of something that is a symptom of research. The research symptom in question is something that is the target of the research (Nasution, 2017). The variable of this research is the benefits of noni fruit (Morinda citrifolia) as an antimicrobial.

Data Collection Procedures

1. Read scientific writings related to the topic of the benefits of noni fruit (Morinda citrifolia) as an antimicrobial being researched. The data taken has met the inclusion and exclusion criteria, apart from that the data has all information regarding title, author, date and year, source, abstract, research objectives, research methods, materials, and results or data.

2. Evaluate the scientific writings that have been read. The journal used as a source has met the inclusion and exclusion criteria, and the source used is guaranteed reliable.
3. Make a summary of the scientific writing that has been evaluated, by noting important points or problems that will be discussed in the research.
4. Analyze all scientific papers and read them completely according to the problem.

Literature Review Technique

1. Looking for similarities (Compare), namely conducting a review by looking for similarities between several scientific papers and then concluding.
2. Looking for differences (Contrast), namely conducting a review by finding differences in several scientific papers and then drawing conclusions.
3. Summarize, namely reviewing by rewriting the source in your own words.

RESULTS AND DISCUSSION

Results Study

Based on direct observations in various scientific publication media regarding the benefits of noni fruit *(Morinda citrifolia)* as an antimicrobial, so obtained results are as follows:

Data Recapitulation Benefit And Compound Which Can Use As Antimicrobial.

No	Author	Time From Method		Preparation	Benefit Compounds	
1.	Retnaningsih 2019	Effectiveness Fruit Extract *albicans* on The mice Exposed *Candida albicans*.	*true experiment tal with design pre-post test randomize d control groups* design	Extract fruit noni	Flavonoids, saponin, oil essential	Giving fruit extract noni through potential antifungal can lower fungal colonies in mice pliers are infec *Candida Albicans*
2.	(Djuramang, et al., 2017)	Influence Extract Fruit noni *(Morinda citrifolia)* to growth *Staphylococcus aureus*	Design Random Complete (RAL)	Extract fruit noni	Flavonoids, terpenoids, and alkaloids	Addition Extract nono Capable hinder Development *Staphylococcus aureus*
3.	(Mayaserli, 2021)	Test Resistor nd power Test Kill Extract Noni (Morinda citrifolia) For Development Bacteria *Staphylococcus aureus*	Experimental	Extract fruit noni	*Scopelin ascorbic AC ID, beta carotene, l-arginine, and proxeronine*	Giving fruit extract noni capable kill bacteria *Staphylococcus aureus* starts from concentration 25 mg.

Discussion

Noni fruit *(Morinda citrifolia)* is a type of tree plant with and twisted trunk, that reaches 3-8 m high. Noni fruit is a fruit hump, shaped bumps No regular, fleshy, when ripe meat fruit watery And own color yellow dirty or white yellowbrass, 5-10 cm long, 3-6 cm wide. Noni fruit has many seeds, one noni fruit can have more than 300 seeds. Matter That, can cause a variation in the form And size of fruit noni (Kusuma, 2022). Various studies have

shown that fruitNoni *(Morinda citrifolia)* has various benefits, one of which is that fruit noni can used as an antimicrobial.

A study titled" Effectiveness of Noni *(Morinda citrifolia) Extract* for Reducing Clusters Mold *Candida albicans* Mice exposed *Candida albicans"*, states that giving extract fruit noni through potency antifungals can reduce the fungal group of mice infected with *Candida albicans* with a dose of 50 mg/kg body weight, 100 mg/kg body weight and 200 mg/kg body weight. Based on the analysis ANOVA, obtained a *p-value of* 0.217, which is greater than α: 0.05 (p>0.05). Reduced group mold No significant after administering different doses of noni extract.

A study done by Mayaserli and Sita, 2021, states that extracted fruit noni is capable kill the bacteria *Staphylococcus aureus.* This study uses method experimental laboratory using the Kirby-Bauer disk diffusion method to know the diameter zone resistor And zone kill *Staphylococcus* bacteria *aureus*. Noni fruit extract concentrations used are 25mg, 50mg, 75mg, and 100mg, And ciprofloxacin is positive control, whereas Aquadest is control negative. Results study obtained that a concentration of 75 mg – 100 mg can kill Staphylococcus aureus bacteria with more than 20 kill zones formed mm, this shows power powerful kill zone. This is influenced by the presence of the compound *scopoletin, ascorbic acid, beta carotene, l-arginine,* and *proxeronine* which have properties as antibacterial. The enzyme *proxeronase* and *the alkaloid proxeronine*, these two substances will form an active substance called *xeronine* in the body. Enzyme here it is Which can push growth bacteria *Staphylococcus aureus*.

All three journals state that noni fruit *(Morinda citrifolia)* has the potential as an antimicrobial. However, from these three journals, several different compounds in fruit noni have the potential as antimicrobial, as stated in research by Retnaningsih, 2019 that compound Which potential as antimicrobial are flavonoids, saponins, and essential oils. The second study by Djuramang *et al*, 2017 stated that the compound potential as antimicrobial in fruit noni is Flavonoids, terpenoids, and alkaloids. Flavonoid compounds are chemical compounds that nature as antibacterial, mechanisms They work with denatured protein cell bacteria. Compound terpenoids are naturally antibacterial compounds, their mechanism of action is to destroy the cell walls of bacteria. Compound Alkaloids can act as antibacterials by disrupting the peptidoglycan components in cells bacteria so wall layer cells are not formed completely and are not perfect because they do not contain peptidoglycan and cell walls only cover the cell membrane. Whereas in the third study by Mayaserli and Shinta, 2021, it was stated that the compound in noni fruit that has the potential to act as an antimicrobial is *scopoletin, ascorbic acid, beta carotene, l-arginine,* and *proxeronine* which have properties as antibacterial. These compounds will form an active substance called xeronine in the body. The compound will carry blood flow to body cells. Xeronine is an essential component in cell membrane proteins. Every cell has a membrane consisting of a protein layer. The protein membrane is fully responsible for healthy cell function. The protein layer is composed of peptides. these peptides are connected by bonds, where the bonds will become weak without the role of xeronine alkaloids.

CONCLUSION

Noni fruit *(*Morinda *citrifolia)* has been proven to be used as an antimicrobial Because the fruit's noni compound Which nature is antifungal and antibacterial. Compound phytochemicals in fruit noni Which potential as antimicrobials are flavonoids, saponins, essential oils, terpenoids, alkaloids, *scopoletin, ascorbic AC ID, beta carotene, l-arginine,* and *proxeronine.*

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