



Conference Paper

The Potential of *Phyllanthus Niruri* Plant Secondary Metabolites in Providing Antiviral Protection Against Sars-Cov-2: A Literature Review

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Abstract.

Covid-19 is a disease that causes respiratory tract infections in humans. The Covid-19 pandemic has spread throughout the world. Meniran (*Phyllanthus niruri*) is a plant that has been empirically shown to be an antiviral. This study aimed to determine the potential of *Phyllanthus niruri* and its compounds as an antiviral for SARS-CoV-2 through a literature review. The data were analyzed descriptively using the NVIVO 12 Plus software. The parameters used were the hierarchy chart, cluster analysis, and word cloud. The results showed that two secondary metabolites of *Phyllanthus niruri* have the potential to provide antiviral protection against SARS-CoV-2, namely quercetin and rutin. Further research is needed to examine the validity of these findings through triangulation of the scientific reports and research in the laboratory.

Keywords: antivirus, *Phyllanthus niruri*, SARS-CoV-2

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Published 15 September 2022

Publishing services provided by
Knowledge E

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Selection and Peer-review under the responsibility of the ICMEDH Conference Committee.

1. INTRODUCTION

Covid-19 (Corona Virus Disease 2019) is a disease outbreak that causes respiratory tract infections in humans. The Covid-19 pandemic is not only happening in Indonesia, but also almost all over the world. On December 31, 2019, the World Health Organization (WHO) announced that the Covid-19 case began with a case of pneumonia with an unknown cause in Wuhan City, Hubei Province, China. In the end, the cause was known, namely SARS-CoV-2, this case continued to grow until there were reports of deaths and the virus spreading outside China.

Data Covid-19 cases collected by Johns Hopkins University have confirmed as many as 184,623,712 cases and 3,993,298 deaths due to SARS-CoV-2. The data is valid until July 7, 2021. Meanwhile in Indonesia, the Communication Team for the Committee for

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Handling Corona Virus Disease 2019 (Covid-19) and the National Economic Recovery reported that 3,372,374 cases and 92,311 deaths were due to SARS-CoV-2. The data was obtained until July 30, 2021.

Control and prevention of Covid-19 is needed as an effort to deal with situations like this. One of the prevention efforts that can be done is to increase the body's resistance to virus attacks. The use of herbal medicines has been empirically proven to maintain a healthy body and prevent infection with viruses. This has also received support from the POM Agency which supports the use of Indonesian herbs and traditional medicines to be developed into herbal medicines as health supplements to prevent Covid-19 [1].

Examples of herbal plants that have been proven to be antiviral are meniran (*Phyllanthus niruri*). This plant contains chemicals such as tannins, potassium, flavonoids (quercetin, quersitrin, isoquersitrin, astragalin, rutin; kaemferol-4-ramnopiranoside, eridiktol-7-ramnopiranoside), and lignans (cubebin dimethyl ether, urinatetralin, nirurine, phylantinuriside), hypophilanthine, triterpene lup-20-en-3-bo) [2].

Based on the description above, the research used NVIVO 12 Plus software to be able to answer the problem formulation. The literature review on the pharmacological activity as an antiviral of the plant *Phyllanthus niruri* against SARS-CoV-2 was analyzed qualitatively using the NVIVO 12 Plus software. This study also proves secondary metabolite compounds that have the potential as antivirals against SARS-CoV-2.

2. RESEARCH METHODS

This study uses a qualitative descriptive analysis method in several scientific journals which aims to explain *Phyllanthus niruri* as an herbal plant that has the potential as an antiviral for SARS-CoV-2 that causes Covid-19 by using the NVIVO 12 Plus software.

Researchers use a laptop or PC (personal computer) with system specifications of the HP Laptop model 14s-dk0xxx, AMD A9-9425 RADEON R5 processor, 4GB RAM, and Windows 10 OS. Scientific journal data collection through Harzing Publish or Perish on a search on Google Scholar, and Pubmed

3. RESULTS

Manual code dan Autocode						
Name	Files	References	Created On	Created By	Modified On	Modified By
antiviral	27	101	18/08/2021 23:53	Z	16/08/2021 13:01	NV
<i>Phyllanthus niruri</i>	16	119	18/08/2021 23:53	Z	17/08/2021 15:24	Z
Quercetin	23	149	18/08/2021 23:53	Z	17/08/2021 15:28	Z
Rutin	5	55	18/08/2021 23:53	Z	17/08/2021 15:27	Z
SARS-CoV-2	29	168	18/08/2021 23:53	Z	18/08/2021 23:21	Z

Figure 1: Coding Results.

Determination of coding is done by manual and autocode techniques. This is to narrow the search and focus more on test analysis. Based on the coding results, 5 main keywords were obtained, namely antiviral, *Phyllanthus niruri*, quercetin, rutin, and SARS-CoV-2. These keywords can be useful when searching for topics throughout the article.

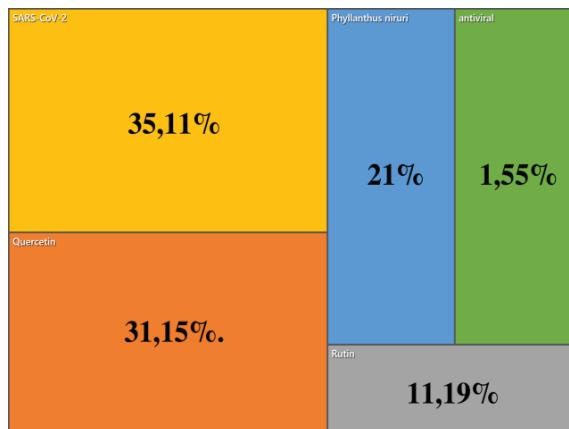


Figure 2: Hierarchy Chart.

Hierarchy charts are needed to determine the percentage of qualitative results from both manual and auto code coding. In this study, the highest percentage of keywords on the hierarchy chart was obtained from the SARS-CoV-2 keywords of 35.11%. Furthermore, the keyword Quercetin ranks second with a percentage of 31.15%. Keywords *Phyllanthus niruri* ranks third with a percentage of 21%. Routine Topics ranks fourth with a percentage of 11.19% and antivirus ranks fifth with a percentage of 1.55%.

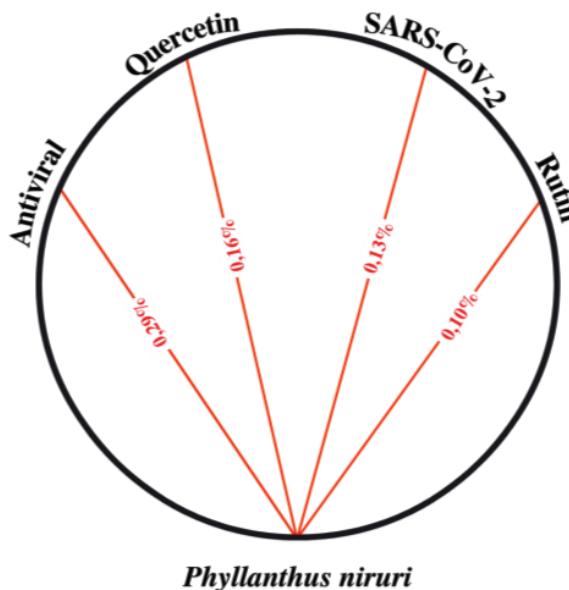


Figure 3: Cluster Analysis Diagram of *Phyllanthus niruri* and Other Nodes with Person Correlation.

The relationship between the main keywords can be seen using the percent correlation. This will assist researchers in finding the relationship between *Phyllanthus niruri* as a candidate for antiviral agents. Based on proximity using the person correlation coefficient, it can be seen that from all scientific journals on the topic of *Phyllanthus niruri* and Quercetin it has a value of 0.16% (Figure 3). This shows that *Phyllanthus niruri* which contains Quercetin has a weak correlation in the journal. Although the correlation obtained is weak, this indicates that Quercetin is a secondary metabolite contained in *Phyllanthus niruri*.

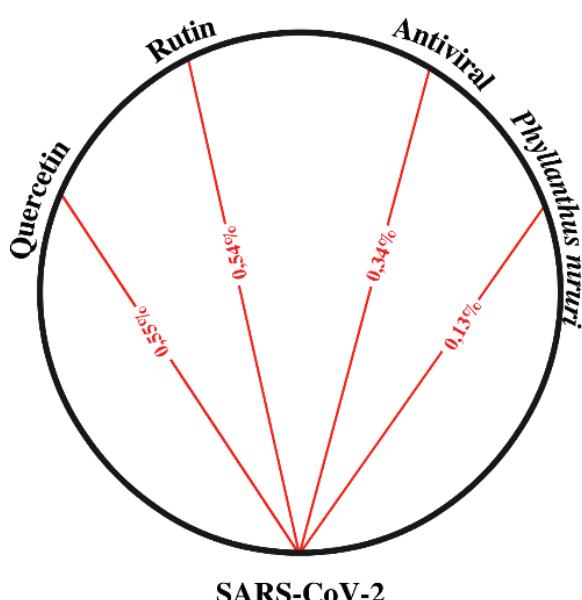


Figure 4: Cluster Analysis Diagram of SARS-CoV-2 Nodes and Other Nodes with Person Correlation.

In addition to the keyword *phyllantus niruri*, the search for topic correlation also used the keywords SARS-CoV-2. It aims to compare and strengthen the relationship between the two topics.

Word cloud shows the 25 main keywords that are frequently reviewed in each article. The bigger the keyword seen in the image, the more often the keyword is reviewed in the article. On the other hand, the smaller the keyword seen in the image, the less frequently the intensity of the keyword is reviewed in the article

4. DISCUSSION

4.1. Coding

This study carried out the coding process using 2 ways, namely manual code and autocode. This is done because the results of the autocode have not been able



Figure 5: Word Frequency 25 Words That Often Appear n=33 Scientific Journals.

to answer all the existing problems. In this study, the nodes used were antivirus, Phyllanthus niruri, Quercetin, Rutin, and SARS-CoV-2. The selection of nodes is based on the formulation of the existing problem and is expected to answer every problem. These nodes will be able to assist researchers in seeing the relationships in the resulting data. The coding results can be seen in Figure 2. The five keywords obtained will help in the next search.

4.2. Hierarchy Chart

Hierarchy chart is an analysis tool that generates a hierarchical diagram created using the selected source or node. The results of the hierarchical chart data analysis can be seen that SARS-CoV-2 is the most frequently discussed with a percentage of 35.11%. Quercetin ranks second with a percentage of 31.15%. As many as 21% of scientific journals discuss Phyllanthus niruri. Routine Topics ranks fourth with a percentage of 11.19% and antivirus ranks fifth with a percentage of 1.55%. The hierarchy chart diagram along with the percentages can be seen in the following image. This shows that there is a correlation of words that often appear in scientific articles for discussions related to topics such as in Figure 3.

4.3. Cluster Analysis

Cluster analysis generate diagrams in the form of relationships related to keywords or nodes with one another. Based on proximity using the person correlation coefficient,

it can be seen that from all scientific journals on the topic of *Phyllanthus niruri* and Quercetin it has a value of 0.16% (Figure 3). This shows that *Phyllanthus niruri* which contains Quercetin has a weak correlation in the journal. Although the correlation obtained is weak, this indicates that Quercetin is a secondary metabolite contained in *Phyllanthus niruri*. While the correlation between SARS-CoV-2 and Quercetin has a value of 0.55% (Figure 4), indicating a fairly good to good correlation in the journal. This was demonstrated in a study [3] which stated that Quercetin can impair the interaction between S-protein and ACE2 through simultaneous binding to both. This dual targeting approach can produce a synergistic interfering effect resulting in better anti-SARS-CoV-2 activity. Not only Quercetin was found to have potential against SARS-CoV-2, but Rutin compounds also have potential as an antiviral with a person correlation coefficient of 0.54%. This indicates that there are quite a number of articles that discuss these two topics in their descriptions. The effectiveness of Rutin was suggested by previous research [4] which stated that Rutin may have potential as an Mpro inhibitor (main protease) which plays an important role in the maturation of many viral proteins.

4.4. Word Cloud

Results Word cloud analysis also supports this research by finding the 25 most frequently used words in scientific journals. This stage uses the word frequency feature, then selects 25 words related to the topic of discussion and reduces unrelated keywords. The results of this word cloud analysis can help researchers find keywords that often appear in journals more easily. The more often the word appears, the more relevant it shows the relationship. The word cloud feature can help researchers find main keywords that can strengthen the correlation of the topics being searched for.

5. CONCLUSION

The results of this literature review can be concluded as follows:

1. This study has been able to explain the potential of meniran (*Phyllanthus niruri*) as an antiviral for SARS-CoV-2 qualitatively using the NVIVO 12 Plus software.
2. The secondary metabolite compound that has potential as an antiviral for SARS-CoV-2 in meniran (*Phyllanthus niruri*) is the flavonoid group, including Quercetin and Rutin.

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