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THE POTENCY OF BAJAKAH TAMPALA (*Spatholobus littoralis Hassk*) AN INDIGENOUS INDONESIAN HERBAL MEDICINE : A BIBLIOMETRIC APPROACH

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ABSTRACT

Bajakah tampala (*Spatholobus littoralis Hassk*) has significant potential in the pharmaceutical field and could become a source for drug discovery and development in the future. This bibliometric analysis aimed to map existing research to identify novelties and gaps for future studies. The research method involved a literature review using bibliometric analysis, using the keyword "bajakah tampala" in Publish or Perish 8, followed by metadata organization using Mendeley and VOSviewer to map research trends. The research findings indicate that Bajakah tampala exhibits variability and gaps in its antioxidant and anti-inflammatory properties, and there is still limited research on this topic. Further research is needed to establish a link between antioxidant and anti-inflammatory effects.

Keywords: Bibliometrics, Bajakah tampala, antioxidants, anti-inflammatory, Publish or Perish (POP), VOSviewer

INTRODUCTION

Bajakah tampala is a popular plant in certain regions of Indonesia due to its antioxidant and anti-cancer properties. It is used in traditional medicine by various communities, especially in Kalimantan, for various purposes, including the prevention and treatment of cancer (Hasna et al., 2022). Based on preliminary tests, positive results were found for phenolics, flavonoids, tannins, and saponins (Yuniarti et al., 2021).

Bajakah tampala has a high potential for phytocosmetic properties. Several flavonoids, including catechin, daidzein, formononetin, glicitein, luteolin, apigenin, hesperetin, naringenin, neglected, and kaempferide have been reported to have cosmetic properties. This data review is based on in silico, in vitro, in vivo, and clinical studies of the flavonoid activities of other extracts. Cosmetic properties include antioxidant, anti-inflammatory, photoprotective, and anti-aging activities, including tyrosinase, elastase, collagenase, and hyaluronidase inhibitors (Novalia et al., 2023).

Bibliometric analysis is a research method that uses bibliographic or bibliometric data (such as citation indices, authors, and journals) to evaluate and analyze scholarly production, research impact, trends, and collaborations within a particular field of knowledge or discipline. This method is commonly used in the field of bibliometrics, a branch of information science and information studies (Donthu et al., 2021). The bibliometric method can be used to map knowledge structure. The most commonly used maps in bibliometric mapping of science and scholarship include co-citation maps, which consist of journal co-citations, document co-citations, author co-citations, bibliographic coupling, co-word descriptors, and co-classification (Purwantoro 2022).

Some theoretical studies on bibliometrics that can be found are as follows: Bibliometric analysis to map research trends, this research discusses the importance of

novelty in a research topic (Pauji et al., 2023). The role of bibliometric analysis in library science research has explored the research progress on a specific topic (Triandini et al., 2019). This bibliometric analysis aimed to explore the novelty and gaps in research development regarding Bajakah Tampala. The subject of this study was examined to identify areas for further research.

RESEARCH METHODS

This is a bibliometric literature review, which is a systematic and explicit method that includes topics and authors (Nurfauzan et al., 2021). Data were retrieved using Publish or Perish 8 by searching for the keyword *'Spatholobus littoralis* Hassk' on Google Scholar on January 18, 2024. Latin words were used in the keywords to exclude articles on other bajakah articles, such as bajakah kalawit. The search was limited to data from 2018 to 2023, 2018 there was relatively little research data on Bajakah Tampala.

The search results from Publish or Perish were converted to a 'ris' file format. Then, Mendeley was used to verify author keywords, identify duplicate articles, and check for the presence of journal articles.

The results of the Mendeley check were exported in the 'ris' file format. Subsequently, an analysis was conducted using VOSviewer software.

Tools and Materials

This review used Publish or Perish 8 to retrieve relevant articles from Google Scholar. Mendeley was used to organize the metadata of the articles, and VOSviewer 1.6.20 is used to map the articles.

Article Selection Criteria

The journal is taken from Google Scholar with the keywords Bajakah Tampala, and excludes newspapers, magazines, books, book reviews, book chapters, and anything that is not a published scholarly article.

Research Procedure

Based on the results of a pop search in the Google Scholar database, 118 journal articles matched the search criteria out of the maximum number of articles searched, which was 1000.

The data from the popular search were inputted into Mendeley to check for author keywords, journal relevance to the theme, duplicate articles, and author names. The Mendeley check yielded 54 articles, which were then inputted into the VOSviewer.

RESULTS AND DISCUSSION

Research Developments in the Field of Spatholobus littoralis hassk

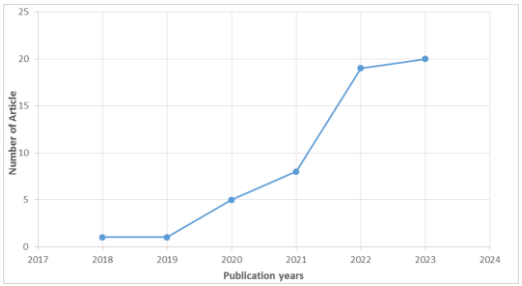

Figure 1. Journal Articles on Bajakah Tampala indexed in Google Scholar between 2018 - 2023 that Meet the Criteria

Figure 1 shows an increasing trend in research journal articles in Bajakah Tampala from 2018 to 2023. In 2023, the highest number of articles was published, totaling 20.

Researcher Productivity

Table I. Verify Selected Author

Author	Documents	Total Link Strength
Ayuchecaria, n	3	2
Saputera, m m a	4	2
Ferdinan, a	3	0
Pangkahila, w	3	0
Susanto, b n a	3	0

From the table above, it can be confirmed that Saputera, M.M.A., is the author who has published the most articles about Bajakah Tampala with 4 articles, and these 5 authors have network connections with each other (**Figure 2**).

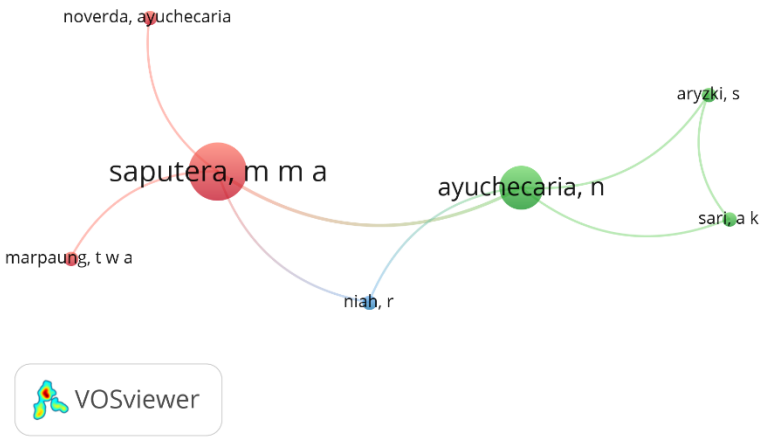

Figure 2. Authors Network Visualization

The development map of publications using the keyword Bajakah Tampala had several discussion item clusters, as shown in **Table I**.

VOSviewer analysis

The color in the overlay visualization indicates the properties of a particular node. The meaning of this node represents a journal, and its color represents the number of times the journal has been cited. In overlay visualization, the color also indicates how the nodes are distributed in the two-dimensional space underlying the visualization. The 17 items were divided into 5 clusters. Cluster 1, consisting of 5 items, includes bajakah roots, antioxidants, bajakah, DPPH, and rats. Cluster 2, comprising 4 items, consists of bajakah tampala, edema, leukocytes, and reactive oxygen species. Cluster 3, with 2 items, includes antibacterial, *Candida albicans*, and *Staphylococcus aureus*. Cluster 4, with 3 items, consists of *Spatholobus littoralis* Hassk, total phenolics, and UV-Vis Spectrophotometer. Cluster 5, with 2 items, includes antioxidants and bajakah stem. The clusters that emerge are the result of published research, and can form the basis for further research. Clusters that have not yet emerged are indicated to be highly correlated, which is a novelty in this research.

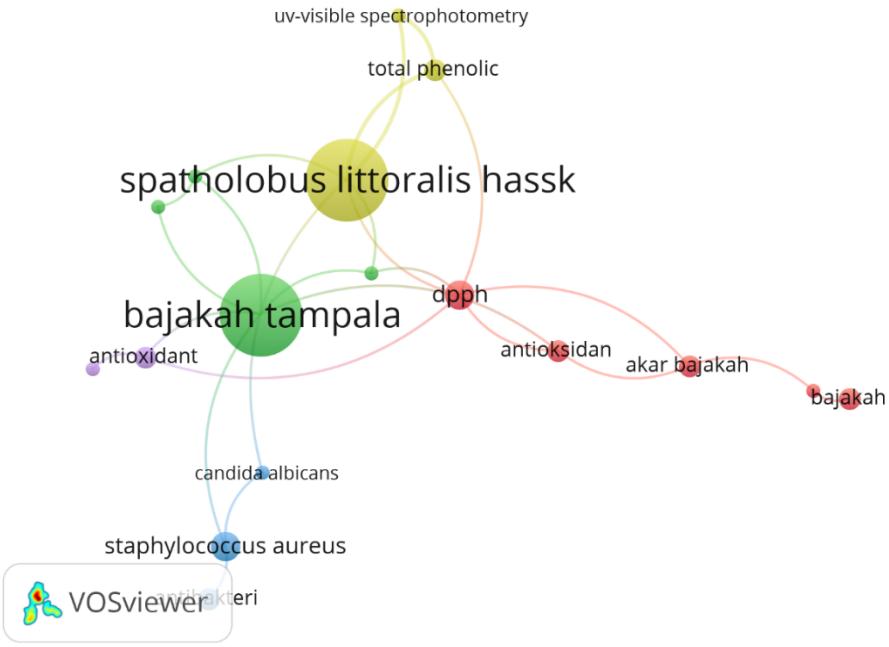

Figure 3. Network Visualization Using VOSviewer

The meaning of this node represents a journal, and its color represents the number of times the journal has been cited. Colors in the overlay visualization indicate the properties of a particular node. In overlay visualization, color also indicates how nodes are distributed in the two-dimensional space underlying the visualization.

The results of VOSviewer for Bajakah Tampala (**Figure 3**) show its activities in relation to antioxidants, leukocytes, edema, reactive oxygen species, and *Staphylococcus aureus*. Activity and effectiveness tests vary between in vivo, in silico, and microbiological tests. The phytochemical screening conducted in the Bajakah Tampala research focuses on determining the total phenolics in the sample using a UV-Vis Spectrophotometer. However, this study does not show what type of extraction is done because it uses only one keyword, on the grounds that this study looks globally at scientific publications on bajakah tampala. The extraction method appears if keyword extraction is added or something related.

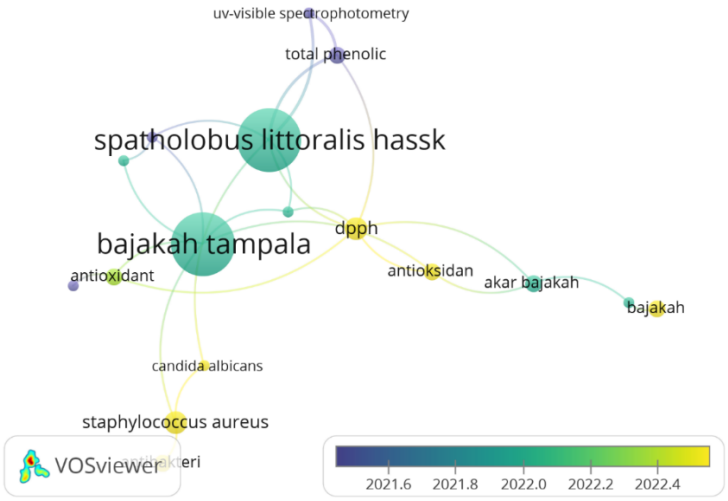

Figure 4. Overlay Visualization Using VOSviewer

This image shows the relationship between topics with the year caption (found in the bottom right corner). The most recent research closely related to Bajakah tampala is associated with antioxidants, DPPH, *Staphylococcus aureus*, *Candida albicans*, and antibacterial activity (**Figure 4**).

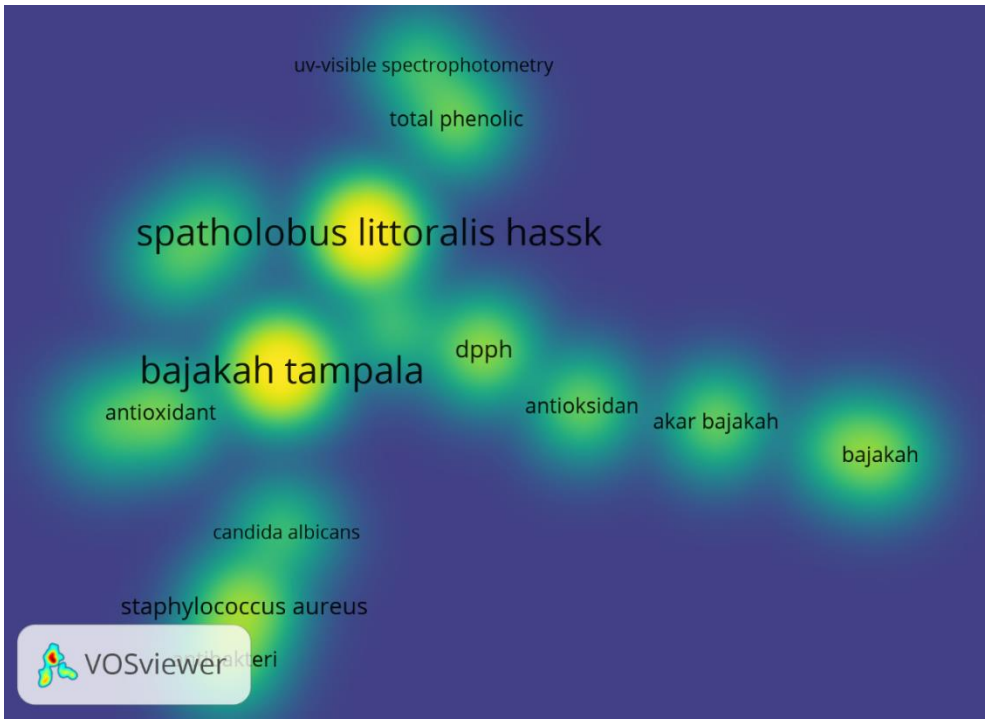

Figure 5. Density Visualization Using VOSviewer

From the figure, it can be observed that the topic is the center of attention. The color is red. If the color is getting blue, it indicates that there is little discussion of the topic. **Figure 5** shows that the most extensively researched studies on Bajakah Tampala are those related to antioxidants, DPPH, Staphylococcus aureus, Candida albicans, and antibacterial properties.

This bibliometric analysis indicates that the novelty in bajakah tampala research is related to antioxidant DPPH, Staphylococcus aureus, Candida albicans, and antibacterial activities.

The antioxidant system is influenced by NRF2, a transcription factor that plays a crucial role in the regulation of genes involved in antioxidant responses and cellular detoxification. NRF2 functions as a master regulator of the cellular antioxidant defense system (He et al., 2020). Antioxidants protect cells from oxidative damage caused by free radicals, which can harm cells and induce inflammation. By stopping or reducing the formation of free radicals, antioxidants can help prevent the potential triggers of inflammation (Lobo et al., 2010). Some antioxidants also exhibit direct anti-inflammatory properties. They can inhibit inflammation by reducing the release of inflammatory mediators or modulating the activities of cells involved in the inflammatory response (Małecka et al., 2021). Antioxidants can affect the activity of anti-inflammatory enzymes, including those involved in anti-inflammatory pathways such as cyclooxygenase (COX) and lipoxygenase (LOX) (Pizzino et al., 2017). Chronic inflammation is strongly linked to various chronic diseases including heart disease, diabetes, and cancer. The consumption of antioxidants can help prevent or reduce the risk of these diseases by lowering inflammation levels (Pizzino et al., 2017). Antioxidants and anti-inflammatory agents work together to maintain a balance in the body. They protect against oxidative damage and help regulate inflammation levels, which are important for the proper functioning of the immune system (Małecka et al., 2021).

DPPH was used as the free radical in the antioxidant capacity tests. When a substance or compound containing antioxidants is added to a DPPH solution, the antioxidants can transfer electrons to DPPH, changing the color of the solution from purple to yellow. This color change reflects the ability of the antioxidant to neutralize free radicals. The reaction between DPPH and antioxidants produces a stable compound, indicating that antioxidants can combat oxidative damage. The effectiveness of a substance or compound in capturing and deactivating free radicals can be measured by color change. DPPH can be used to determine the concentration of antioxidants in a sample. A higher antioxidant capacity indicates greater ability to neutralize DPPH free radicals (Baliyan et al., 2022).

Several studies have indicated that antioxidants may have antimicrobial properties or support the immune system in combating bacterial and fungal infections, including Staphylococcus aureus and Candida albicans (Hoseini-alfatemi, 2015). Staphylococcus aureus and Candida albicans can induce oxidative stress in the body. Antioxidants can help protect cells from damage caused by excessive oxidative reactions (Pizzino et al., 2017). Some plants rich in antioxidants may also possess antibacterial properties. Plant extracts with high antioxidant contents are often used in research related to the development of natural antibacterial compounds (Parham et al., 2020).

Research on bajakah tampala is still very limited, and published research mostly discusses antioxidants and antibacterials, and is closely related to these research themes. This raises several questions: Is it possible that bajakah tampala has potential in other fields? This bibliometric study does not answer this question because it is based on published research. However, this research can be an opening to do things that have not been revealed here.

CONCLUSION

Research on Bajakah Tampala, the theme of antioxidants, is a novel area that holds value in innovation. The combination of unconnected links and the possibility of new clusters or unexplored aspects represents a gap for further research. The density of research on bajakah remains relatively low.

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