POTENCY OF DEVELOPMENT GRAPTOPHYLLUM AS ONE OF INDONESIAN ORIGINAL HERBS; A BIBLIOMETRIC STUDY

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ABSTRACT

Indonesia is home to thousands of herbal medicine, and one of the species that would gain more popularity is the Graptophyllum species. This indigenous Papua island plant grows as a shrub plant in the garden of many houses. This study aims to map the research available about this species and explore the potential effects of this plant. Methods. The bibliometric study was performed to map the articles. Scopus databases and Vosviewer were used in this study. Results. 53 articles were withdrawn from Scopus databases. Indonesia has the highest number of publications and many Indonesian researchers collaborated with authors from Japan, Switzerland, and Sweden. The keywords were divided into three clusters and most of the composition discussed was flavonoid. The species discussed was the *Graptophyllum pictum.* Conclusion. As one of the Indonesian herbal medicine, *Graptophyllum* pictum is more popular in its own country. Hopefully, the development of chemical drugs from *Graptophyllum pictum* will be in its own country.

Keywords: Herbs; Indonesia; Native; Opportunity; Chemical.

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INTRODUCTION

Indonesia, a tropical nation in Southeast Asia, offers various and diverse traditional herbal remedies, 2500-7500 plants out of 30,000-40,000 are regarded to be therapeutic plants (Cahyaningsih R, Brehm JM, Maxted N, 2021). One of the original plants that has gained popularity in Indonesia since a decade ago is *Graptophyllum* sp. *Graptophyllum pictum* is native to Papua Island, and this shrub can be found in the gardens of houses (Ahmad S, 2002).

There are several caplets containing *Graptophyllum pictum* in the Indonesian market. Many Indonesian are familiar with the name Daun Ungu or Daun Wungu (*Graptophyllum pictum* sp). The popular effect of those Daun Ungu caplets is anti-hemorrhoid. Even though many tablets containing *Graptophyllum* are in the Indonesian market, the clinical research on its medicinal effectiveness is regarded as minimal or inadequate.

This article will highlight *Graphtophyllum* species, to explore the Indonesian national herbal medicine heritage. A bibliometric study is used to map the research available and scrutinize other aspects that have not been studied before.

It is hoped that this bibliometric study will be the framework of future exploration of these plants to acknowledge many beneficial effects in medicine.

MATERIALS AND METHODS

We used one database which is Scopus, that covers thousands of journals. Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books, and conference proceedings. The keyword used is TITLE-ABS-KEY (*Graptophyllum*).

The time of screening database was performed from January to February 2023. Fifty-three articles are withdrawn from the Scopus database, and analyzed in terms of the number of publications by year, by affiliation, by source, by countries, by subject, and based on document type. There is no screening of the articles. All of the articles are in English.

To visualize the correlation of co-authorship, co-occurrence, citation, bibliographic coupling, and co-citation map based on authors or countries, we used Vosviewer 1.6.18. VOSviewer is a software tool for creating maps based on network data and for visualizing and exploring these maps. This study did not need ethical clearance because there is no involvement of human or animal samples. This section may be divided by subheadings and should contain sufficient explanation so that all procedures can be repeated in the future.

RESULT

Authors started to write about *Graptophyllum* in 1989, and two decades after the number of articles reached a peak in 2020, decreased gradually to 2021, plateaued to 2022, and decreased to one article at the beginning of 2023 (Figure 1A).

The highest number of articles published by the Journal of Ethnopharmacology (5 articles), AIP conference proceedings (4 articles), Malaysian Journal of Medicine and Health (3 articles), and Pharmacognosy Journal (3 articles), and their rest of the journal covered two articles and one article (Figure 1B).

A similar trend was depicted in the number of articles by affiliation. Authors from Universitas of Airlangga were in the first rank with 14 articles published. There were outside Indonesian universities, such as the University of Lagos, Karnatak University, and the University of Dschang with two articles (Figure 1C).

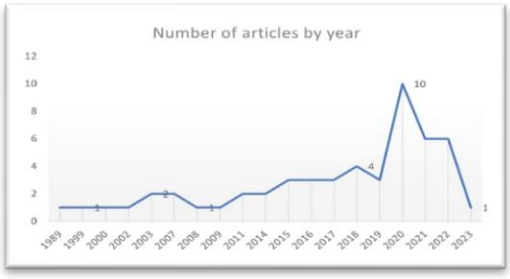

Figure 1A. Number of Articles by Year

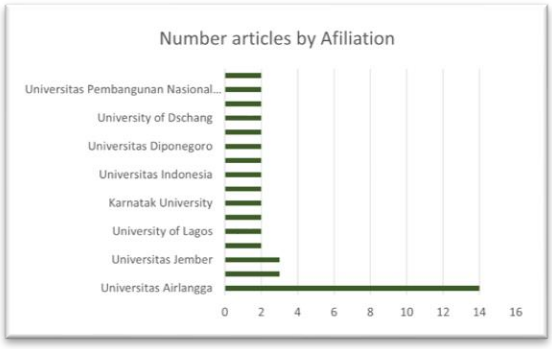

Figure 1B. Number of Articles by Affiliation

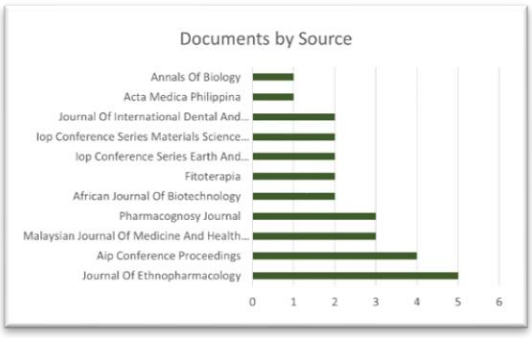

Figure 1C. Number of Articles by Source

Regarding countries with the highest number of publication, Indonesia were in the first rank (30 articles), Australis (5 articles), India, Malaysia (4 articles), Cameroon, and Japan (2 articles). Western countries such as the United States, Sweden, and Switzerland (1 article) (Figure 2A). Indonesian authors collaborated with Switzerland, Japan, and Sweden in their publication (Figure 2B). Kusumaningsih collaborated with Suhargo, Kurniawati, Jiangsheubchatvera (Figure 2C).

Figure 2A. Number of Articles by Countries.

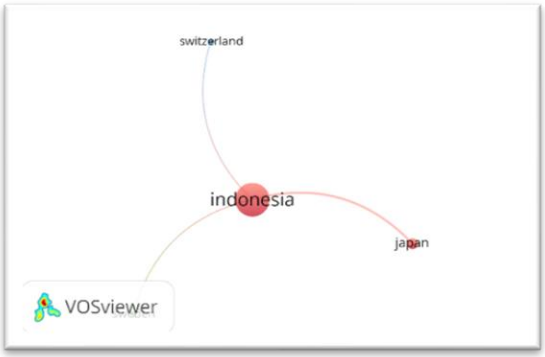

Figure 2B. Indonesia has the Highest Number of Publications and with the Co-Authorship Based on Countries

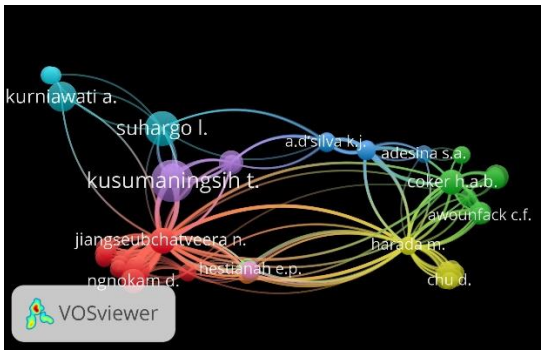

Figure 2C. Network visualization of citations based on countries

The highest number of articles by subject were in pharmacology, toxicology, and pharmaceuticals (18 articles), medicine (14 articles), agricultural and biological sciences (10 articles), biochemistry, genetics and molecular biology (10 articles), physics and astronomy (6 articles).

Some subjects were quite far correlated, such as earth and planetary sciences, engineering (2 articles), and social sciences (1 article) (Figure 3A). Forty one articles were published in form of articles in journals, 9 articles in conference papers, 2 articles as review papers, and one as an editorial paper (Figure 3B).

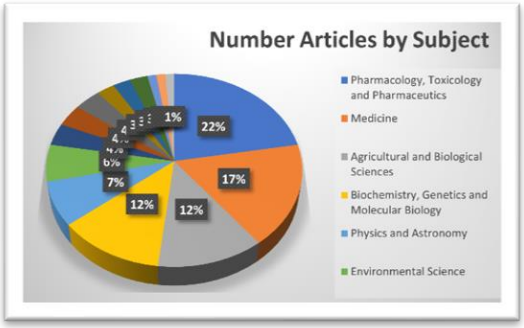

Figure 3A. Number of Articles based on Subject

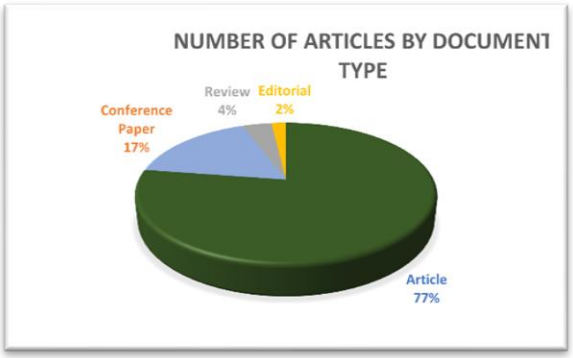

Figure 3B Number of Articles Based on Document Type

Figure 4 Network Visualization of Co-occurrence based on Keywords (minimum number of keywords per article are three) and resulted in 88 keywords divided in three clusters.

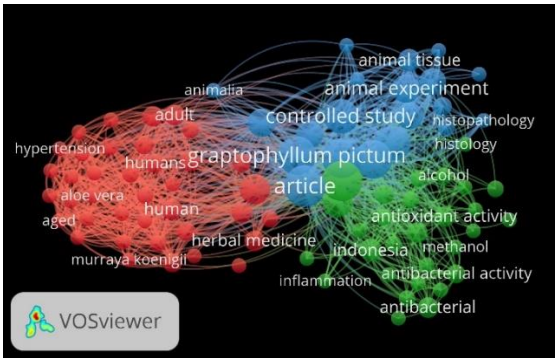

Figure 4A. These Vosviewer findings resulted in three clusters with 88 keywords

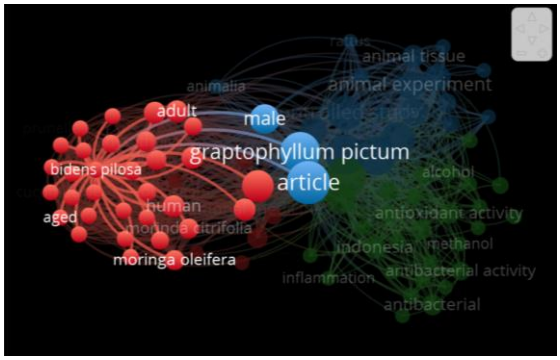

Figure 4B. *Graptophyllum pictum* connected with bidens Pilosa, moringa oleifera in cluster red

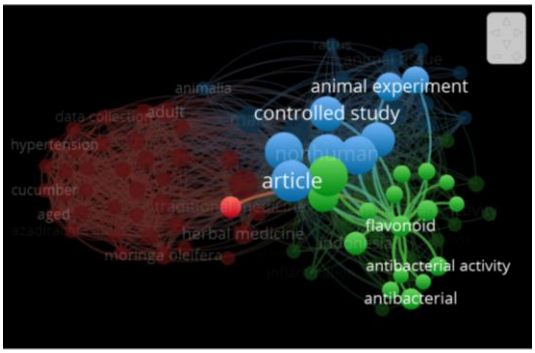

Figure 4C. Those keywords related with antibacterial activity

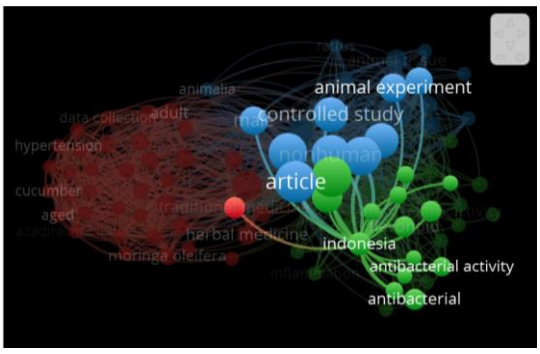

Figure 4D. *Graptophyllum* keywords connected to Indonesia and animal experiment

Figure 4 shows the co-occurrence articles based on keywords. This Vosviewer findings resulted three clusters with 88 keywords (4A). *Graptophyllum pictum* connected with bidens Pilosa, moringa oleifera in cluster red (Figure 4B), and when related to the flavonoid content, those keywords related with antibacterial activity (Figure 4C). *Graptophyllum* keywords connected to Indonesia and animal experiment (Figure 4D).

DISCUSSION

Many authors started to publish about *Graptophyllum* sp since 1989 and reached its peak in 2021. Because the majority of articles came from Indonesia, the plausible explanation for this timeline would be related to the condition in Southeast Asia. Unlike in Western countries, seventy-five percent of the world's population did not expose to Western medicine and those people depend ultimately on the heritage of the countries or herbal medicine. In southeast Asia, there were many barriers to the widespread of western medicine, such as constraints in transportation, communication, and beliefs about western medicine(Ahmad S, 2002). In 2021, during the pandemic events, the Indonesian put more interests in alternative medicine or herbal medicine (Rokhmah D, et al., 2020).

In this study highlights *Graptophyllum* species and the only plant which results in was *Graptophyllum pictum*. However, there are about 15 species of *Graptophyllum* species (Tagousop CN, et al.,2017). *Graptophyllum pictum* are one of the most popular genus, used as herbs in folk medicine (Perry & Metzger, 1980).

One of the beneficial components of Graptopyllum was flavonoid and its related to anti-inflammation and anti-oxidant. Similar studies proved that Graphtophyllum pictum L. Griff ethanol and hexane extract composed of secondar metabolite such alkaloid, flavonoid, fenol, saponin, and tannin. Flavanoid was higher in hexane extract than ethanol by using spectrophotometer (Makkiyah FA, et al., 2022).

Regarding the potency of anti-oxidant, there is a tendency to develop this species to overcome in stroke disease. Stroke is still the major threat to Indonesian people, because It does not cause mortality but also high dependency rate that will affect not just patients, family and also the community (Kemenkes, 2018).

Observing the small amount of articles published by non-Indonesia in this species, gives a fact that this indigenous plant would

be the popular herbal medicine in its own country. However, these steps should not just be performed by the investigators, but also by the other stakeholders.

CONCLUSION

As one of the Indonesian herbal medicine, *Graptophyllum pictum* is more popular in its own country. Hopefully, the development of phytopharmaca from *Graptophyllum pictum* will be in its own country.

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