



RESEARCH ARTICLE

# Current Perspectives and Trend of Uncaria Gambir Roxb in Cancer: Bibliometric Analysis

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## ABSTRACT

Uncaria gambir Roxb. is a traditional plant with potential as a potent anticancer. This study will evaluate the current perspectives and research trends on Uncaria gambir Roxb. in cancer treatment using Dimensions database-based bibliometric analysis. Data was collected by searching the keyword “Uncaria gambir Roxb” with the period of 2015-2024. The results of the study obtained 1,446 titles and after adjusting the inclusion and exclusion criteria, 1,114 article titles were obtained. The results showed a significant increase in the past decade, reflecting the growing interest in the application of Uncaria gambir phytochemicals, such as catechins and tannins, as anticancer agents. The geographical distribution of the research shows Indonesia to be the country with the most documents related to this topic. This is due to the natural availability of these plants. International collaborations are emerging, but are still limited. The fields of pharmacology and biotechnology are the main focus of research, with prominent in vitro and in vivo assays to evaluate mechanisms of action, such as apoptosis induction, proliferation inhibition and antioxidant effects. This study concludes that Uncaria gambir has great potential as a cancer therapeutic agent, but more clinical trials are needed to support its validity. The results of this analysis provide strategic insights for future research development, particularly in improving scientific validity and expanding global collaboration.

## INTRODUCTION

Breast cancer is one of the non-communicable diseases with the highest incidence rate in the world. According to GLOBOCAN 2020 data, breast cancer accounts for 11.7% of total global cancer cases, with more than 2.2 million new cases each year (Sung et al, 2021; Sedeta et al, 2023). In Indonesia, breast cancer is also the cancer with the highest prevalence, which is around 16.6% of total cancer cases in 2020 (Widiana et al, 2020; Gondhowiardjo et al, 2021). This high incidence rate indicates the need for greater attention to prevention, early diagnosis, and effective treatment to reduce mortality from breast cancer (Bhushan et al, 2021; Caswell-Jin et al, 2022).

Despite various therapeutic options such as chemotherapy, radiotherapy, and targeted therapy, the use of cancer drugs often leads to various significant side effects (Baldo et al, 2018; Van Den Boogaard et al, 2022). Side effects such as damage to healthy tissues, drug resistance, and immune system

disorders are major challenges in cancer treatment (Weinmann and Pisetsky, 2019). In addition, the high cost of treatment is also an obstacle for most patients, especially in developing countries such as Indonesia. Therefore, safer, more affordable and effective alternative approaches to cancer treatment are needed.

Research on medicinal plants as an alternative source of cancer treatment is growing. Various bioactive compounds contained in plants have been shown to have anti-cancer activity, such as flavonoids, alkaloids, tannins, and polyphenols (Fernández, et al., 2021; Arribas et al, 2024). Various studies have shown that the use of natural compounds from plants not only has good effectiveness, but also more minimal side effects compared to conventional therapies (Tran et al, 2020; Sauter, 2021). This encourages further exploration of the potential of medicinal plants as anti-cancer agents, including in the treatment of breast cancer.

*Uncaria gambir* Roxb. also known as gambir, is one of the medicinal plants that has great potential in cancer treatment (Munggari et al, 2022; Wardana et al, 2023). The plant is known to contain various phytochemical compounds, such as catechins, tannins, and flavonoids, which have high antioxidant and anti-inflammatory activities (Saad et al, 2020; Wardana et al, 2023). These compounds play a role in inhibiting cancer cell proliferation, inducing apoptosis, and reducing oxidative stress that contributes to cancer development (Dükel et al., 2021; Wang et al, 2022). With this potential, *Uncaria gambir* Roxb. becomes one of the important candidates in research on the development of plant-based cancer drugs, bibliometric studies are needed (Suhastinah et al, 2024).

Bibliometric research is a quantitative analysis method used to measure and analyze scientific publications, research trends, and the contributions of authors, institutions, or countries in a field of science. It utilizes bibliographic data obtained from databases such as Scopus, Web of Science, or PubMed to evaluate publication patterns, scientific collaboration, and research impact through metrics such as citation count, h-index, and keyword co-occurrence analysis. The main goal of bibliometric research is to provide insights into the development of science based on objectively measurable data. Using software such as VOSviewer or Biblioshiny, researchers can create data visualizations in the form of network maps, temporal trends, or cluster analysis of relevant research topics (Mashuri et al, 2024).

In the context of modern research, bibliometrics is an important tool to map the development of a particular research topic, identify research gaps, and determine future research directions. For example, in the health field, bibliometrics can be used to analyze trends in plant-based cancer drug research, including countries' contributions to the research, high-impact journals, and frequently occurring keywords. Thus, bibliometrics not only helps scientists to understand the scientific dynamics in a field, but also provides data that supports more targeted and strategic research policy making (Mashuri et al, 2024; Masniah et al, 2024).

## **MATERIALS AND METHODS**

### **Data source**

Data on *Uncaria gambir* Roxb was obtained from the Dimensions database. Dimensions is one of the scientific databases that is widely used for bibliometric analysis because it has the advantage of providing extensive, integrated, and easily accessible data. One of the main advantages of Dimensions is its comprehensive data coverage, which includes more than 120 million research documents from various types of publications such as journal articles, books, book chapters, patents, clinical trials, and research funding. Dimensions also links data to grants and policies, enabling deeper analysis of the impact of research on the real world. This provides a new dimension to understanding research patterns, collaborations and emerging trends globally.

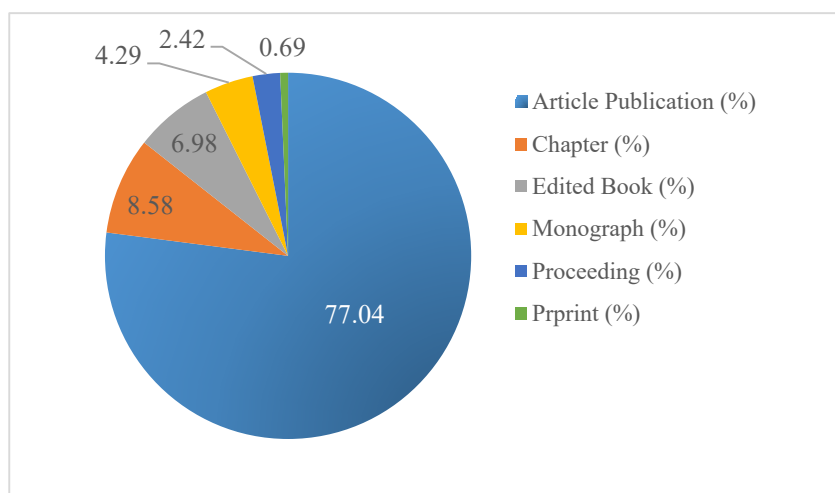
Data exploration was conducted on January 11, 2025, with the keyword “*Uncaria gambir* Roxb” (Figure 1). These keywords were used in the title, abstract, or keywords of scientific articles. Inclusion criteria were as follows: Dimensions database literature, primary research (original articles or conference papers), articles in scientific publications published in 2015-2024, English language, and topics relevant to *Uncaria gambir* Roxb.

## Data analysis

Data yang sesuai dengan kriteria inklusi dan eksklusi lalu disimpan dalam format CSV dan divisualisasikan menggunakan aplikasi VOSviewer. Aplikasi ini dapat diunduh secara gratis di web dengan alamat <https://www.vosviewer.com/>. Aplikasi VOSviewer aktivitas farmakologi serta identifikasi kandungan senyawa kimia *Uncaria gambir Roxb*. (Mashuri et al, 2024; Masniah et al, 2024)

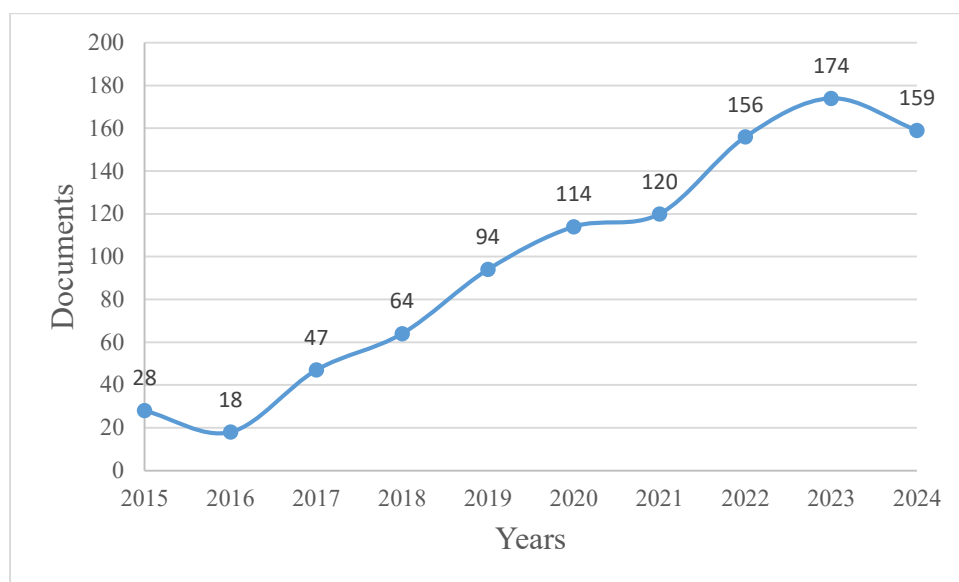
## RESULTS AND DISCUSSION

Data that met the inclusion and exclusion criteria were saved in CSV format and visualized using the VOSviewer application. This application can be downloaded for free on the web at <https://www.vosviewer.com/>. VOSviewer application pharmacological activity and identification of chemical compounds *Uncaria gambir Roxb*. (Mashuri et al, 2024; Masniah et al, 2024).



**Figure 1: Total number of documents for 10 years (2015-2024)**

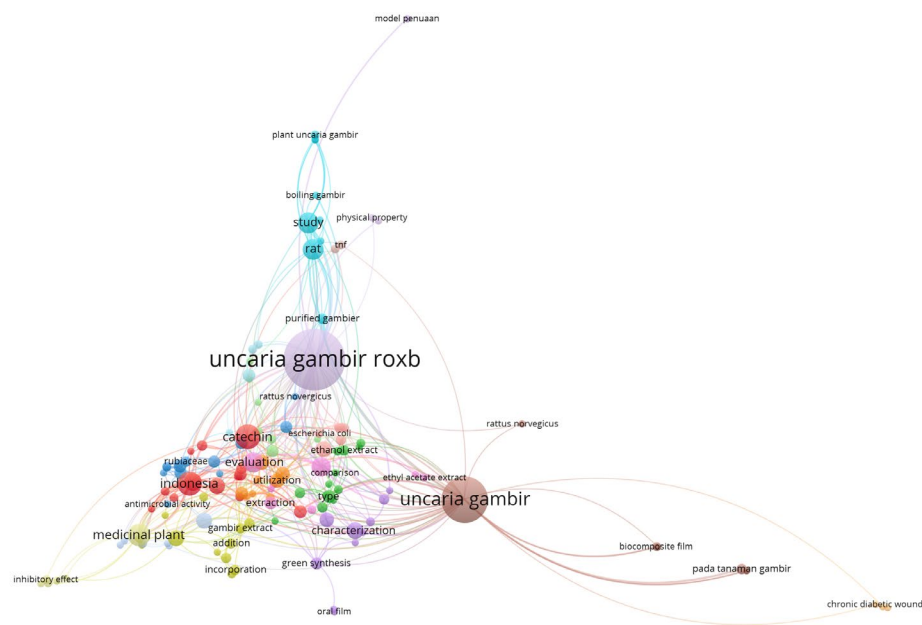
Exploration of publication data also shows that the trend of research on *Uncaria gambir Roxb* has increased in the last ten years as shown in Figure 2.



**Figure 2: Number of documents per year**

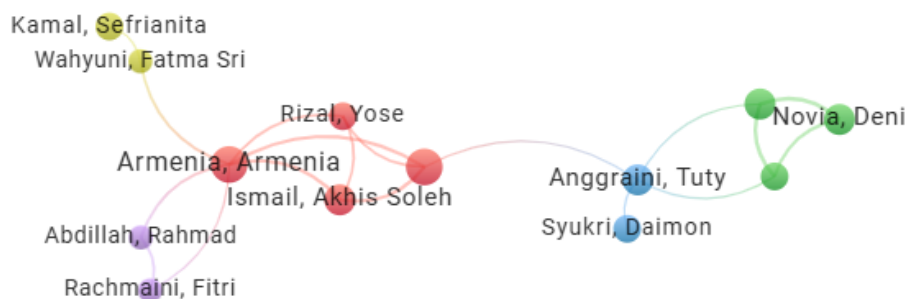
Figure 2 shows that research on *Uncaria gambir Roxb* has been conducted and has become one of the interesting topics to be researched. Topics that have received attention include those related to antioxidants, anti-inflammatory, antibacterial, antidiabetic, and wound healing (Figure 3). There are still many topics that have not been studied in depth, for example about the anticancer potential of *Uncaria gambir Roxb*. Based on dimension-based data, only two publications related to anticancer

potential were found. This shows that the *Uncaria gambir* Roxb plant is a research field that is still wide open for research by linking previous studies.



**Figure 3: *Uncaria gambir* Roxb research topic 2015-2024**

Figure 3 has shown that previous studies have identified the content of *Uncaria gambir* Roxb. Phytochemical results show that *Uncaria gambir* Roxb contains polyphenolic compounds such as catechins and flavonoids, in addition to alkaloids. These results also provide new insights for future research, namely identifying volatile and non-volatile compounds through GC-MS and LC-MS. The knowledge of the phytochemical components makes it possible to develop new research, such as in silico studies, molecular docking, and isolation to obtain single compounds (Suhartono et al, 2015). This also requires research collaboration with other researchers who have the same topic and focus. The collaboration can be shown in Figure 4.



**Figure 4: Author network with publications related to *Uncaria gambir* Roxb research topics**

Based on Figure 4, it is known that researchers from Indonesia are the pioneers of research related to *Uncaria gambir* Roxb. Ten researchers and institutions with the highest number of documents can be seen in Table 1.

**Table 1: Ten researchers and institutions with the highest number of documents**

Author	Institution	Publication	Citation
Syukri Arief	Andalas University, Indonesia	20	259
Zulhadjri	Andalas University, Indonesia	13	135
Budi Santosa	Universitas Papua, Indonesia	12	45
Selly Ratna Sari	University of Bengkulu, Indonesia	10	4
Arniati Labbani	National Research and Innovation Agency, Indonesia	10	158
Marina Sillahi	Universitas Kristen Indonesia, Indonesia	9	150

Gatot Priyanto	Sriwijaya University, Indonesia	9	39
Rauza Sukma Rita	Andalas University, Indonesia	9	18
Mieke Hermiawati Satari	Padjadjaran University, Indonesia	8	33
Dian Hndayani	Andalas University, Indonesia	8	120

Table 1, shows that Andalas University, Indonesia is an institution that has conducted many studies using *Uncaria gambir* Roxb. Andalas University is the oldest university in West Sumatra, Indonesia. Andalas University was officially opened on December 23, 1955. Meanwhile, *Uncaria gambir* Roxb is one of the plants that is studied more deeply because 80% of the national Gambir supply comes from Sumatra. Gambir (*Uncaria gambir* Roxb) is a shrub plant that is a strategic plantation commodity that grows and develops in West Sumatra Province. The people of West Sumatra use this plant for the healing process of wounds on the skin, both burns and bleeding wounds.

## CONCLUSION

Bibliometric studies related to *Uncaria gambir* Roxb found 1,446 documents and 1,114 documents according to the criteria set. The topic of research on *Uncaria gambir* Roxb is still a topic that is still widely open for research. This can be seen from the number of documents in the last 10 years (2014-2023) which shows an increasing trend. This bibliometric analysis found that research on *Uncaria gambir* Roxb is mostly related to antioxidants, anti-inflammatory, antibacterial, antidiabetic, and wound healing. Only 2 articles discussed anticancer. This study also revealed that Andalas University, Indonesia is the institution with the highest number of documents.

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