



RESEARCH ARTICLE

Mapping International and Regional Collaboration Networks in African Traditional Medicine Research: A Bibliometric Analysis (2000 – 2024)

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Abstract

Background: African Traditional Medicine (ATM) plays a central role in healthcare across Africa and contributes to global drug discovery through its long-standing use of herbal, ritual, and spiritual practices. Although research output in ATM has increased, evidence on international and regional collaboration patterns remains limited. Understanding these partnerships is critical for strengthening research productivity, knowledge exchange, and the integration of traditional medicine into formal healthcare systems.

Methods: A descriptive bibliometric analysis was conducted using peer-reviewed ATM-related publications indexed in the Scopus database from 2000 to 2024. Publication trends, authorship patterns, institutional productivity, and country-level collaborations were analysed. Co-authorship and collaboration networks were visualised using VOSviewer and Bibliometrix (R package).

Results: A total of 2,392 publications were identified, representing an approximately 85-fold increase over the study period. South Africa led research output (37.4%), followed by Nigeria (4.8%), while the United States and the United Kingdom were the main non-African collaborators. Van Staden J., Afolayan A. J., and Maroyi A. were the most prolific authors. South African institutions, particularly the University of KwaZulu-Natal, University of Pretoria, and University of Fort Hare, dominated institutional output. Strong collaborative links were observed between South Africa and Nigeria, the USA, and the UK, with additional contributions from France, Germany, India, and Australia.

Conclusions: ATM research has expanded substantially, with South Africa serving as a key collaboration hub. However, intra-African collaboration remains limited. Strengthening regional partnerships, institutional capacity, and funding is essential for advancing evidence-based traditional medicine in Africa.

Keywords: African Traditional Medicine, Bibliometric analysis, Collaboration networks, Co-authorship, Research productivity, Africa

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Introduction

African Traditional Medicine (ATM) remains a cornerstone of healthcare in Africa, serving as the first line of treatment for over 80% of the population¹⁻³. It encompasses a long-standing system of healing that integrates the use of medicinal plants, spiritual practices, rituals, and ceremonies

to diagnose, treat and prevent diseases^{4,5}. Although herbal medicine constitutes the major component of ATM, the spiritual and ritual dimensions remain integral to its holistic approach to health. Rooted in indigenous knowledge systems, ATM plays a crucial role in disease prevention, management and the discovery of new drugs

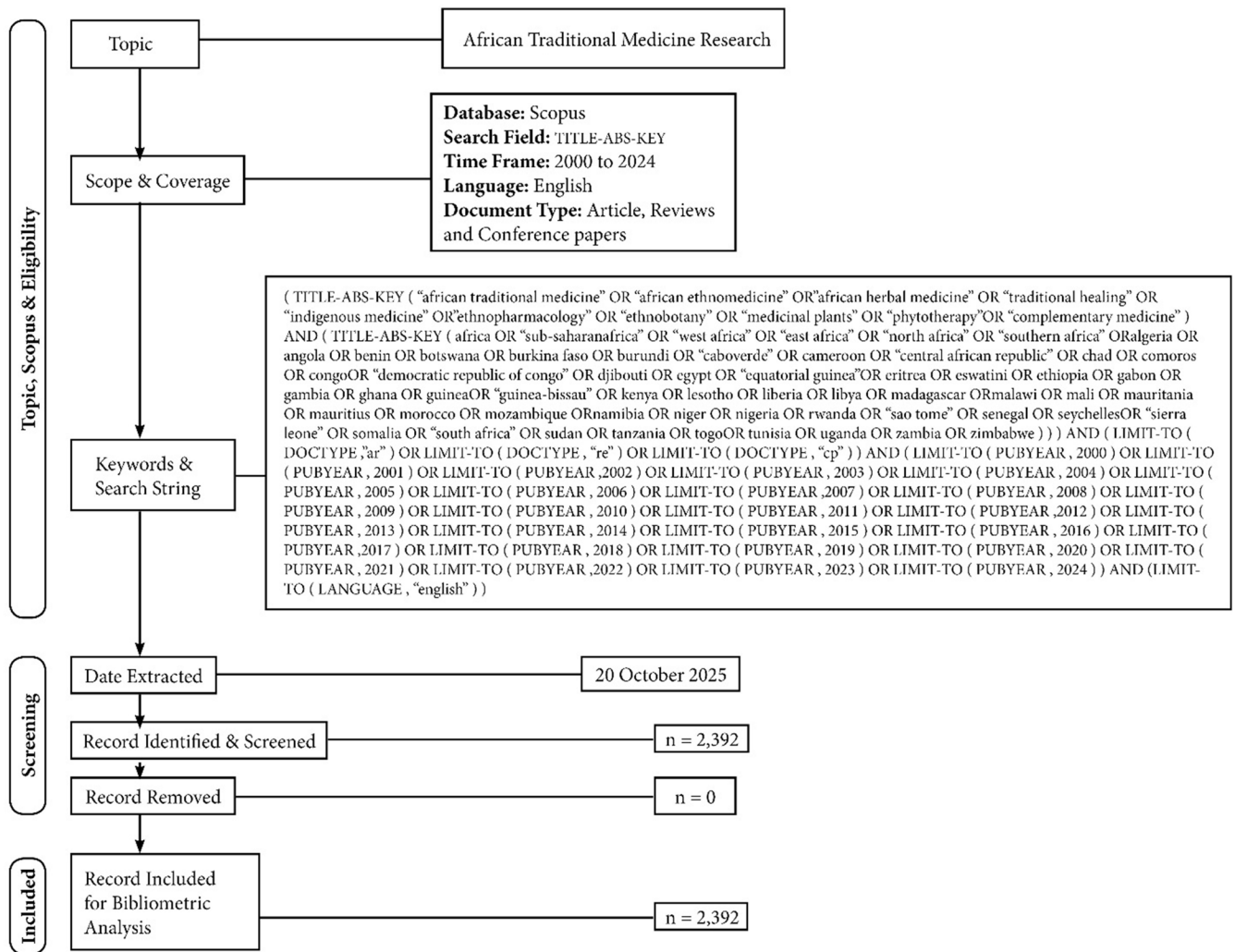


Figure 1: Flow diagram of the search strategy

6.7. Studies have identified numerous bioactive compounds from African medicinal plants with therapeutic potential, particularly in treating malaria, inflammation and pain^{8,9}. These highlight the importance of ATM as both a cultural heritage and a scientific resource for modern drug development.

Global attention to traditional and complementary medicine has grown rapidly, motivated by the demand for affordable, accessible, and culturally relevant healthcare solutions^{10,11}. The World Health Organization (WHO) recognises traditional medicine as a vital pathway to achieving universal health coverage and has supported African countries to strengthen research, regulation, and integration into national health systems¹²⁻¹⁴. Significant progress has been made in areas such as policy development, collaboration between traditional and conventional health practitioners, and quality assurance¹². However, evidence-based integration of ATM remains limited, primarily due to a lack of rigorous clinical validation and standardised methodologies^{9,15}. Researchers have emphasised the need for robust, evidence-based studies,

including clinical trials, to confirm the safety and efficacy of traditional medicines and support their inclusion in formal healthcare systems⁹.

Research collaboration is central to advancing ATM knowledge production and innovation. Partnerships among traditional healers, scientists, policymakers, and global health stakeholders enhance the documentation and validation of traditional medical knowledge^{1,2}. Such collaborations foster interdisciplinary research, resource sharing, and capacity building, thereby enhancing the visibility and impact of African scholarship within global scientific communities. Strengthened collaborative networks can also address challenges related to fragmented data, duplication of research efforts, and limited research infrastructure, thereby facilitating the development of evidence-based traditional medicine practices^{12,16,17}.

Despite growing research outputs in ATM, no bibliometric study has systematically examined the patterns and dynamics of international and regional collaboration in this field. Existing bibliometric efforts have focused mainly

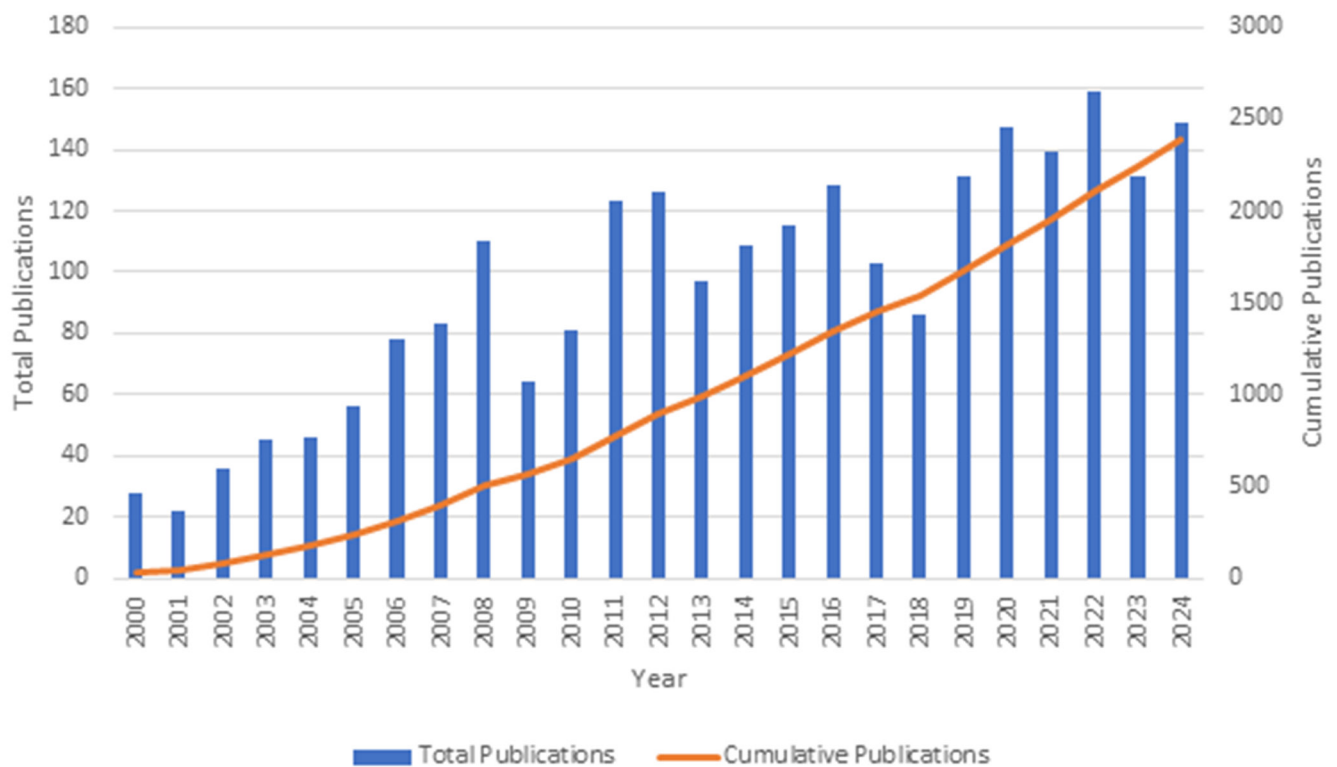


Figure 2: Publication Trends of African Traditional Medicine Research.

on thematic trends or species-specific analyses rather than mapping collaborative structures. For instance, Rafiu et al. (2025) conducted a bibliometric and ethnobotanical analysis of plant utilisation in Nigeria, revealing regional variations and limited collaboration among researchers. Similarly, Reddy et al. (2024) used bibliometric mapping to visualise research trends on *Scelletium* species in South Africa, focusing on phytochemical and pharmacological aspects rather than co-authorship networks. Chelghoum et al. (2021) explored the use of medicinal plants among Algerian diabetic patients using ethnopharmacological and bibliometric approaches, but did not analyse research partnerships or institutional linkages. While these studies provide valuable insights into national and species-level research developments, they do not capture the broader network of collaboration that drives ATM research across Africa and beyond.

This lack of systematic investigation into collaborative networks represents a major gap in the literature. Understanding how researchers, institutions, and countries interact can reveal the structure, intensity, and evolution of partnerships supporting ATM research. Mapping these networks can identify leading contributors, cross-border collaborations, and emerging hubs of innovation that influence research visibility, knowledge exchange, and policy development^{17,21}.

Through bibliometric analysis of co-authorship patterns, institutional linkages, and country-level partnerships, the study sought to uncover the key actors, trends, and collaborative structures shaping the advancement and global integration of ATM research.

The specific objectives were to assess publication and authorship trends in ATM research (2000–2024), identify leading authors, institutions, and countries, examine patterns of international and regional co-authorship, highlight gaps and provide recommendations to strengthen collaboration.

Methods

Study Design

This study employed a descriptive, retrospective bibliometric design to analyse research output and collaboration networks in African Traditional Medicine (ATM) between 2000 and 2024. Bibliometrics is a quantitative research approach that applies mathematical and statistical techniques to measure and analyse scientific publications, their relationships, and their influence within specific fields of knowledge. This definition is well established across numerous authoritative sources, including highly cited works by Durieux and Gevenois (2010) and Ninkov et al. (2021), which emphasise

Table I. The Top 20 Countries contributed to African Traditional Medicine Research

Country	Total Publications (N=3545)	Percentage (%)
1. South Africa	1325	37.38
2. Nigeria	170	4.80
3. United States of America	158	4.46
4. United Kingdom	123	3.47
5. Burkina Faso	111	3.13
6. Germany	94	2.65
7. France	89	2.51
8. Cameroon	81	2.28
9. Kenya	66	1.86
10. Uganda	64	1.81
11. India	63	1.78
12. Ghana	48	1.35
13. Belgium	45	1.27
14. Denmark	44	1.24
15. Italy	42	1.18
16. Morocco	39	1.10
17. Netherlands	39	1.10
18. Ethiopia	38	1.07
19. Canada	36	1.02
20. Tanzania	36	1.02

Data source: Scopus (Elsevier), 2025

bibliometrics as a systematic and objective means of evaluating scientific communication²⁴.

The methodology serves three primary purposes: to measure research productivity, to assess quality and impact using citation-based indicators, and to map structural relationships among publications, authors, and research areas²⁴. By applying these principles, bibliometric analysis enables the identification of patterns, trends, and the evolution of knowledge across disciplines²⁴.

Data Source

Data for this study were obtained from the Scopus database (Elsevier), which was selected for its comprehensive coverage of peer-reviewed literature and detailed bibliographic information on authors, affiliations, and citations. Scopus is widely recognised as a reliable source for bibliometric analysis due to its multidisciplinary scope and consistent citation tracking^{22,23}.

Search Strategy

A systematic search was conducted in Scopus to retrieve publications related to African Traditional Medicine. The search incorporated a combination of keywords and their

alternative terms, such as “African traditional medicine”, “ethnomedicine”, “herbal medicine”, (details in the keyword string of Figure 1). The search was conducted on 20 October 2025 and covered the period from 1 January 2000 to 31 December 2024, allowing for a 25-year overview of developments in the field. Only documents published in English were included to maintain consistency in analysis. The Flow diagram of the search strategy is shown below.

Inclusion and Exclusion Criteria

The inclusion criteria comprised peer-reviewed journal articles, reviews, and conference papers explicitly focused on ATM or its applications in healthcare. Studies were included if they fell within the defined time frame and geographic scope. Publications were excluded if they focused on non-African traditional medicine systems such as Chinese or Indian medicine, were unrelated to health or use of medicinal plants, spiritual practices, rituals, and ceremonies, or were non-peer-reviewed materials such as editorials, theses, or book chapters.

Data Extraction and Cleaning

All bibliographic records were exported from Scopus in CSV format, including information on authors, titles, affiliations, countries, publication years, document types, and citation counts. The dataset was cleaned and standardised through a structured disambiguation process. Author names were harmonised using unique identifiers such as Scopus Author IDs and ORCID IDs to minimise ambiguity and ensure consistency. Institutional affiliations were standardised by consolidating name variants into uniform formats, while country names were aligned with ISO standards. No duplicate records were identified. Consistency checks and manual verification were conducted to confirm the accuracy, reliability, and overall quality of the dataset before analysis.

Bibliometric Indicators and Network Analysis

A range of bibliometric indicators was used to assess research productivity and collaboration patterns. Productivity indicators included annual publication counts and document types, while collaboration was measured through the international collaboration rate and co-authorship distribution across regions. The study also identified the most prolific authors, institutions, and countries based on publication.

Co-authorship network analysis was conducted at the author, institutional, and country levels to examine patterns and structures of collaboration.

Table 2. Most Productive Authors of African Traditional Medicine Research

Author's Name	No. of Publications (N=1934)	Percentage (%)
1. Van Staden, J.	122	6.31
2. Afolayan, A.J.	86	4.45
3. Maroyi, A.	48	2.48
4. McGaw, L.J.	45	2.33
5. Aremu, A.O.	41	2.12
6. Eloff, J.N.	41	2.12
7. Viljoen, A.M.	40	2.07
8. Finnie, J.F.	36	1.86
9. Grierson, D.S.	32	1.65
10. Jäger, A.K.	30	1.55
11. Van Wyk, B.E.	29	1.50
12. Lall, N.	27	1.40
13. Witkowski, E.T.F.	25	1.29
14. Ndhlala, A.R.	23	1.19
15. Van Vuuren, S.F.	23	1.19
16. Semanya, S.S.	22	1.14
17. Williams, V.L.	22	1.14
18. Diallo, D.	20	1.03
19. Stafford, G.I.	19	0.98
20. Makunga, N.P.	18	0.93

Data source: Scopus (Elsevier), 2025

Tools and Software

Data analysis and visualisation were carried out using VOSviewer (version 1.6.20) and Bibliometrix/Biblioshiny in R. VOSviewer was employed to generate co-authorship maps while Biblioshiny supported the computation of bibliometric indicators and collaboration indices. These software tools are widely accepted and validated for bibliometric studies ²⁵.

Ethical Considerations

This study relied entirely on publicly available bibliographic data obtained from Scopus. No human participants or confidential data were involved. Ethical approval was therefore not required. All information was used solely for academic and research purposes, in compliance with Scopus' data usage policy and ethical standards for bibliometric research.

Results

Publication Trends of African Traditional Medicine Research

Figure 2 presents the annual publication trends of African Traditional Medicine (ATM) research from 2000 to 2024. Over the past 24 years, a total of 2,392 publications were recorded, indicating a consistent increase in scholarly output. The findings reveal a modest beginning in the early



Figure 3: Leading International and Regional Collaboration patterns of African Traditional Medicine research.

Table 3. Most productive institutions of African Traditional Medicine Research

Institution	Total Publications (n=3331)	Percentage (%)
1. University of KwaZulu-Natal	302	9.07
2. University of Pretoria	166	4.98
3. University of Fort Hare	163	4.89
4. University of the Witwatersrand, Johannesburg	137	4.11
5. University of Johannesburg	107	3.21
6. University of Limpopo	105	3.15
7. Tshwane University of Technology	83	2.49
8. North-West University	82	2.46
9. Université Joseph Ki-Zerbo	64	1.92
10. Stellenbosch University	59	1.77
11. University of Ouagadougou	59	1.77
12. University of the Western Cape	57	1.71
13. Agricultural Research Council, Pretoria	55	1.65
14. University of the Witwatersrand Faculty of Health Sciences	49	1.47
15. University of South Africa	48	1.44
16. University of Zululand	45	1.35
17. University of Venda	44	1.32
18. Rhodes University	42	1.26
19. South African Medical Research Council	42	1.26
20. Makerere University	41	1.23

Data source: Scopus (Elsevier), 2025

2000s, followed by steady growth in subsequent years, as seen in Figure 1.

Between 2000 and 2004, annual publications ranged from n = 22 (0.92%) to n = 46 (1.92%), representing less than 2% of the total output per year. A gradual increase was observed between 2005 and 2008, with annual publications rising from n = 56 (2.34%) to n = 110 (4.60%).

From 2011 to 2016, annual outputs consistently exceeded 100 publications, reaching a peak of n = 128 (5.35%) in 2016. The highest publication counts were recorded in recent years, particularly in 2020 (n = 147; 6.15%), 2022 (n = 159; 6.65%), and 2024 (n = 149; 6.23%).

Overall, cumulative publications increased from n = 28 in 2000 to n = 2,392 in 2024, representing approximately an 85-fold growth in scholarly productivity.

Geographical Distribution of African Traditional Medicine Research

Table 1 presents the geographical distribution of ATM. A total of 3,545 publications were identified, reflecting both regional and international engagement in this field. The distribution indicates that African countries dominate ATM research output, though substantial contributions also come from non-African countries, underscoring growing global interest in African medicinal knowledge systems.

South Africa is the leading contributor with n = 1,325 (37.38%), followed by Nigeria (n = 170; 4.80%). Among non-African countries, the United States (n = 158; 4.46%) and the United Kingdom (n = 123; 3.47%) stand out, illustrating significant international collaboration. Other major contributors include Burkina Faso (n = 111; 3.13%), Germany (n = 94; 2.65%), and France (n = 89; 2.51%).

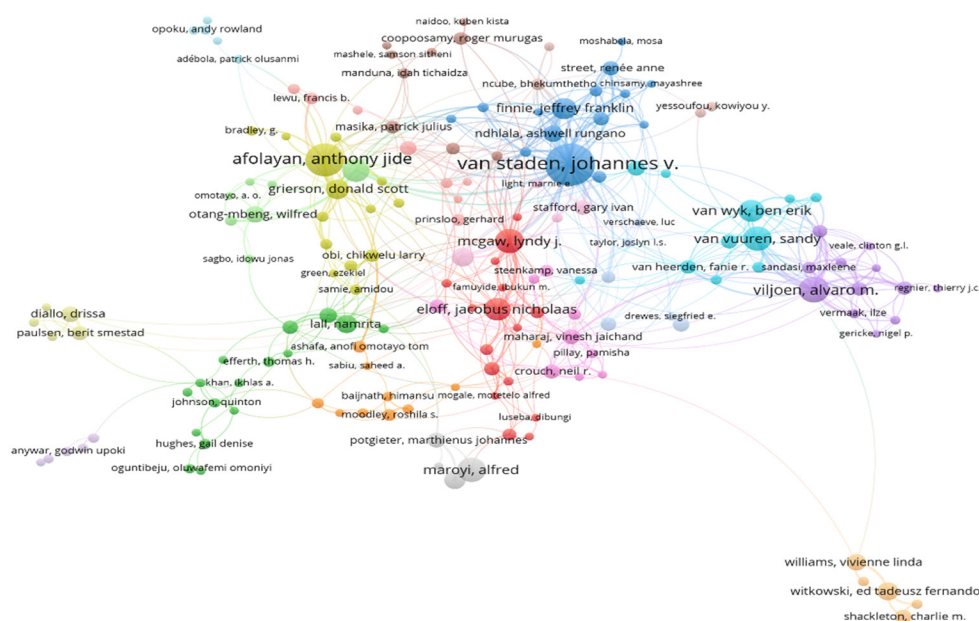


Figure 4: International and Regional Collaborative Network by Authors of African Traditional Medicine Research. Counting method: Full counting; Minimum number of documents of an author = 5; Minimum number of citations of an author = 0; Data source: Scopus (Elsevier), 2025

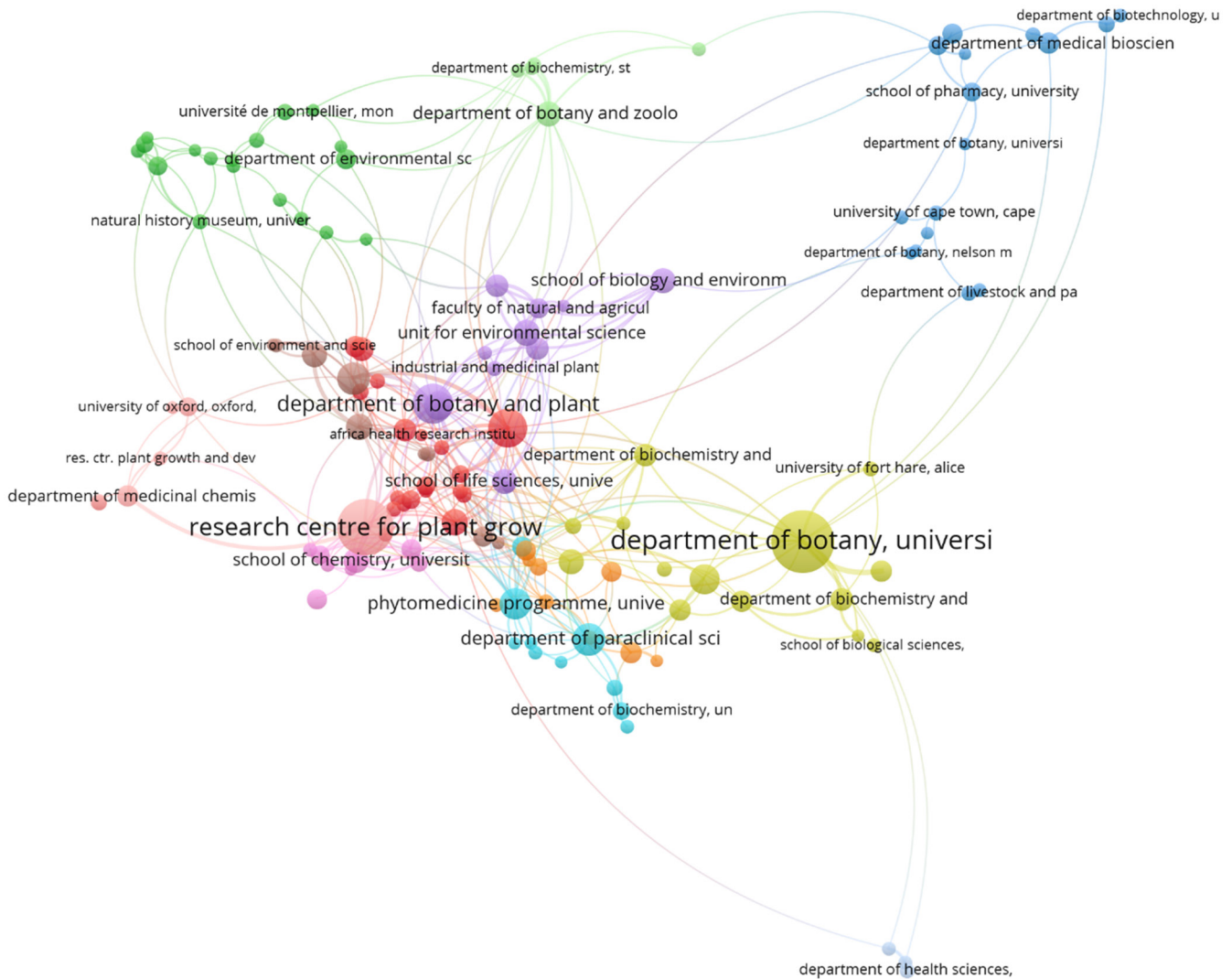


Figure 5: International and Regional Collaborative Network by Institutions of African Traditional Medicine Research
 Counting method: Full counting; Minimum number of documents of an author = 5; Minimum number of citations of an author = 0; Data source: Scopus (Elsevier), 2025.

Additional African contributors include Cameroon (n = 81; 2.28%), Kenya (n = 66; 1.86%), Uganda (n = 64; 1.81%), Ghana (n = 48; 1.35%), Ethiopia (n = 38; 1.07%), and Tanzania (n = 36; 1.02%). Other non-African countries such as India (n = 63; 1.78%), Belgium (n = 45; 1.27%), Denmark (n = 44; 1.24%), Italy (n = 42; 1.18%), Morocco (n = 39; 1.10%), the Netherlands (n = 39; 1.10%), and Canada (n = 36; 1.02%) further highlight the globalised and multidisciplinary nature of ATM research.

Overall, the findings confirm that while South Africa leads the field by a substantial margin, ATM research is geographically diverse and increasingly international in scope.

Authorship of African Traditional Medicine Research

Table 2 identifies the most productive authors in ATM over the period. A total of 1,934 publications

were attributed to the 20 leading scholars, indicating concentrated productivity among a small number of highly active contributors.

Van Staden, J. is the most prolific author with n = 122 (6.31%), followed by Afolayan, A. J. (n = 86; 4.45%), and Maroyi, A. (n = 48; 2.48%). Other major contributors include McGaw, L. J. (n = 45; 2.33%), Aremu, A. O. (n = 41; 2.12%), Eloff, J. N. (n = 41; 2.12%), and Viljoen, A. M. (n = 40; 2.07%).

Several additional authors, such as Finnie, J. F. (n = 36; 1.86%), Grierson, D. S. (n = 32; 1.65%), and Jäger, A. K. (n = 30; 1.55%), have made significant contributions through interdisciplinary research collaborations. The remaining leading contributors, including Van Wyk, B. E., Lall, N., Ndhlala, A. R., Van Vuuren, S. F., Semanya, S. S., Williams, V. L., Diallo, D., Stafford, G. I., and Makunga, N. P., each produced between n = 18 (0.93%) and n = 29 (1.50%).

Overall, the authorship trends indicate that ATM research

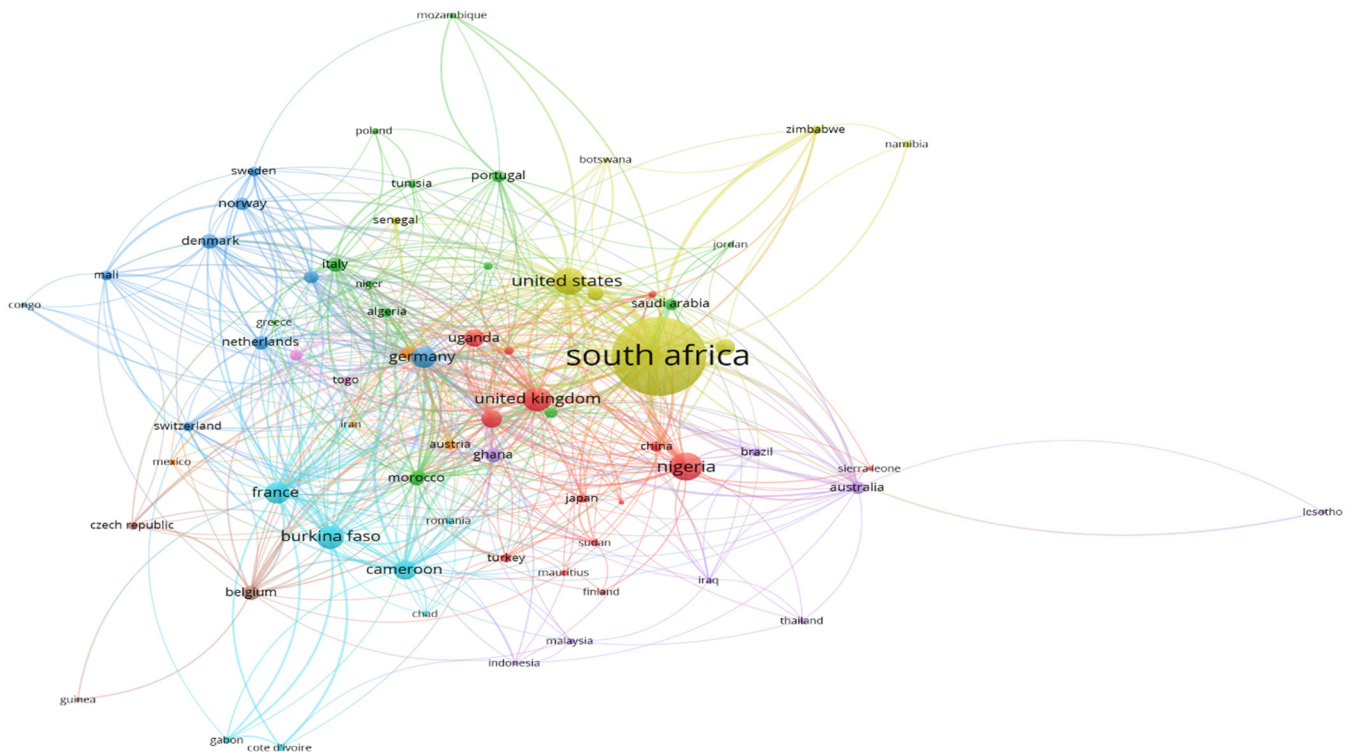


Figure 6: International and Regional Collaborative Network by Countries of African Traditional Medicine Research; Counting method: Full counting; Minimum number of documents of an author = 5; Minimum number of citations of an author = 0; Data source: Scopus (Elsevier), 2025.

is driven by a core group of prolific scholars whose sustained productivity and collaboration have shaped the field's intellectual development and global visibility.

Most Productive Institutions of African Traditional Medicine Research

Table 3 summarises the most productive institutions. A total of 3,331 publications were produced by the 20 leading universities and research organisations, demonstrating the institutional concentration of research output, particularly in South Africa.

The University of KwaZulu-Natal recorded the highest output ($n = 302$; 9.07%), followed by the University of Pretoria ($n = 166$; 4.98%) and the University of Fort Hare ($n = 163$; 4.89%). Other major contributors include the University of the Witwatersrand, Johannesburg ($n = 137$; 4.11%), University of Johannesburg ($n = 107$; 3.21%), and University of Limpopo ($n = 105$; 3.15%).

Additional contributors were Tshwane University of Technology ($n = 83$; 2.49%), North-West University ($n = 82$; 2.46%), and Stellenbosch University ($n = 59$; 1.77%). Outside South Africa, Université Joseph Ki-Zerbo ($n = 64$; 1.92%) and the University of Ouagadougou ($n = 59$; 1.77%) in Burkina Faso, as well as Makerere University ($n = 41$; 1.23%) in Uganda, represent key regional research hubs in West and East Africa.

Overall, the findings show that ATM research is

institutionally concentrated, with South African universities leading continental output while other African institutions demonstrate increasing regional engagement and diversification.

International and regional collaboration patterns of African Traditional Medicine Research

Figure 3 illustrates the leading international and regional collaboration patterns. Based on 1,553 co-authorship links, the data reveal South Africa as the central hub of collaborative activity both within Africa and globally.

The most frequent collaborations occurred between South Africa and Nigeria ($n = 44$; 2.83%), South Africa and the USA ($n = 42$; 2.70%), and South Africa and the United Kingdom ($n = 37$; 2.38%). Other notable partnerships include Burkina Faso and France ($n = 29$; 1.87%), South Africa and Australia ($n = 21$; 1.35%), and South Africa and Denmark ($n = 16$; 1.03%).

Emerging intra-African collaborations include South Africa–Cameroon ($n = 13$; 0.84%) and South Africa–Zimbabwe ($n = 11$; 0.71%), while transcontinental partnerships such as France–Cameroon ($n = 10$; 0.64%), United Kingdom–Denmark ($n = 9$; 0.58%), and USA–Australia ($n = 8$; 0.52%) underscore the increasingly global nature of ATM research.

ATM research collaboration is dominated by South Africa's networks with Europe and North America, while intra-

African partnerships, though growing, remain relatively limited and present opportunities for strengthening continental research integration.

International and Regional Collaborative Network by Authors of African Traditional Medicine Research

Figure 4 summarises the international and regional collaborative networks of leading authors based on 1,170 co-authorship links.

Johannes Van Staden recorded the highest number of links (n = 36; 3.08%), followed by Lyndy J. McGaw (n = 34; 2.91%) and Anthony Jide Afolayan (n = 23; 1.97%). Other leading collaborators include Adeyemi Oladapo Aremu and Alvaro M. Viljoen (each n = 22; 1.88%), Jacobus Nicholaas Eloff (n = 21; 1.79%), and Jeffrey Franklin Finnie (n = 20; 1.71%).

Additional active collaborators include Esam E. Elgorashi, Vinesh Jaichand Maharaj, and Sandy Van Vuuren (each n = 19; 1.62%).

International and regional Collaborative network by institutions of African Traditional Medicine Research

Figure 5 presents institutional collaboration in African Traditional Medicine (ATM) research from 2000 to 2024, based on 716 co-authorship links. Collaboration is concentrated among South African universities and research institutes, reflecting their leadership in advancing ethnomedicine and related fields.

The Department of Botany and Plant Biotechnology, University of Johannesburg, recorded the highest number of collaborative links (n = 19; 2.65%), followed by the Department of Pharmaceutical Sciences, Tshwane University of Technology (n = 18; 2.51%). Three institutions shared equal collaboration strength with n = 16 (2.23%) each: the Agricultural Research Council, Pretoria, the Department of Botany, University of Fort Hare, and the Phytomedicine Programme, University of Pretoria.

Other key collaborators include the Department of Paraclinical Sciences, University of Pretoria (n = 15; 2.09%), and the Department of Botany and Zoology, Stellenbosch University (n = 14; 1.96%).

International and regional Collaborative network by Countries of African Traditional Medicine Research

Figure 6 presents the international and regional collaborative networks by countries based on 2,362 co-authorship links. The data reveal an extensive web

of cross-border partnerships, with South Africa emerging as the central hub of both intra-African and global collaboration.

South Africa recorded the highest number of collaborative links (n = 348; 14.73%), underscoring its pivotal role in driving ATM research across the continent. It was followed by Nigeria (n = 143; 6.06%), the United States (n = 124; 5.25%), and the United Kingdom (n = 117; 4.95%). Other countries with significant collaborative activity include Burkina Faso (n = 109; 4.61%), Cameroon (n = 91; 3.85%), Ghana (n = 78; 3.30%), and Kenya (n = 74; 3.13%).

Among non-African nations, France (n = 82; 3.47%), Germany (n = 68; 2.88%), India (n = 61; 2.58%), and Australia (n = 57; 2.41%) represent major contributors. Additional collaborative participation is evident from Denmark (n = 49; 2.07%), Belgium (n = 44; 1.86%), Canada (n = 41; 1.74%), and Italy (n = 39; 1.65%).

Several African countries, including Uganda (n = 36; 1.52%), Ethiopia (n = 34; 1.44%), Tanzania (n = 32; 1.35%), Zimbabwe (n = 28; 1.19%), and Mozambique (n = 25; 1.06%), also maintain moderate collaboration intensity, mainly through regional research partnerships and South–South networks.

Discussion

This study provides a comprehensive overview of publication output, authorship patterns, institutional contributions, and international and regional collaboration networks in African Traditional Medicine (ATM) research from 2000 to 2024. The findings demonstrate sustained growth in research productivity, alongside increasing participation from both African and non-African institutions, underscoring the growing recognition of ATM as both a scientific domain and a socio-cultural resource.

Growth of Research Output

The steady rise in ATM publications over the past 25 years reflects expanding scholarly and policy interest in traditional medicine across Africa and globally. This trend aligns with international efforts to recognise traditional and complementary medicine as integral to healthcare systems, particularly within the context of universal health coverage^{12,14}. Comparable growth trajectories have been reported in bibliometric studies of herbal and ethnomedicine research in other developing regions^{18,19}, reinforcing the global expansion of traditional medicine scholarship.

Geographical Concentration and Global Engagement

The dominance of South Africa and Nigeria among African contributors highlights the role of established research infrastructure, sustained funding mechanisms, and strong institutional networks in shaping scientific productivity. South Africa's leading position, accounting for over one-third of total output, is consistent with broader patterns in health-related research across sub-Saharan Africa, where the country frequently serves as a regional research hub. This leadership is supported by national policies promoting indigenous knowledge systems and well-developed university–industry collaborations.

Beyond the continent, substantial contributions from the United States, the United Kingdom, France, and Germany illustrate strong global engagement with ATM research, particularly in ethnopharmacology and medicinal plant studies. These patterns reflect the increasing globalisation of traditional medicine research and the growing interdependence of knowledge systems across the Global North and Global South.

Authorship Patterns and Scholarly Leadership

Authorship analysis reveals the presence of a core group of highly productive scholars, including J. Van Staden, A. J. Afolayan, and A. Maroyi, whose sustained contributions have significantly shaped the intellectual landscape of ATM research. Their prominence reflects the maturation of research traditions in fields such as ethnobotany, phytochemistry, and pharmacology. More broadly, the concentration of scholarly output among a relatively small number of authors suggests a “core–periphery” structure within the research community^{26,27}.

While such patterns are common in scientific networks, they also point to structural inequalities in participation. Expanding opportunities for emerging researchers through mentorship, targeted funding, and capacity-building initiatives will be essential to diversify authorship and strengthen the long-term sustainability of ATM research across Africa.

Institutional Contributions and Network Centrality

Institutional analysis further reinforces South Africa's central role, with universities such as KwaZulu-Natal, Pretoria, and Fort Hare emerging as leading contributors with extensive collaborative linkages. These institutions host well-established research programmes in pharmacognosy, ethnobotany, and plant biotechnology, positioning them as regional centres of excellence^{28–31}. The presence of institutions from Burkina Faso and Uganda among notable contributors also signals the

gradual expansion of research capacity in other parts of the continent.

However, institutional collaboration networks remain unevenly distributed, with a strong concentration around South African institutions and comparatively limited interconnections among other African universities. Such centralisation may constrain the broader diffusion of knowledge and capacity development. Strengthening cross-institutional partnerships through continental initiatives, including programmes under the African Union, could facilitate more balanced research leadership and regional integration.

Patterns of International and Regional Collaboration

Co-authorship and network analyses reveal a centralised collaboration structure characterised by strong North–South linkages, particularly between South Africa and partners in Europe and North America. Frequent collaborations with countries such as the United States and the United Kingdom highlight the role of international partnerships in supporting resource access, technological exchange, and research visibility.

Despite these benefits, intra-African collaboration remains comparatively limited. This imbalance is consistent with earlier findings that identify structural barriers such as uneven funding distribution, infrastructural disparities, and limited regional coordination^{1,2}. Enhancing South–South collaboration within Africa is therefore critical for fostering knowledge exchange, strengthening regional research ecosystems, and addressing shared health challenges through contextually relevant traditional medicine research (Kasprowicz et al., 2020, 2023)^{32,33}.

Limitations

This study has several limitations. First, the analysis was restricted to the Scopus database, which, although comprehensive, may not fully capture all relevant African Traditional Medicine (ATM) publications, particularly those published in regional or non-indexed journals. This may result in the underrepresentation of locally produced research. Second, the search strategy, despite being carefully developed, may have excluded relevant studies due to variations in terminology, indexing practices, or language restrictions, potentially introducing selection bias.

Third, bibliometric indicators primarily assess patterns of publication and collaboration but do not evaluate the quality, methodological rigour, or clinical relevance of the included studies. Fourth, co-authorship was used as a proxy for collaboration, which may not fully reflect informal, interdisciplinary, or non-publishing partnerships.

Finally, the study provides a descriptive and retrospective analysis and does not account for contextual factors such as funding disparities, policy environments, or socio-cultural influences that may shape research collaboration in ATM. Future studies could incorporate multiple databases and qualitative approaches to provide a more comprehensive understanding.

Conclusions

The study reveals a remarkable and steady increase in ATM research output, driven largely by South Africa and supported by emerging contributions from other African and non-African countries. South Africa remains the core hub of scholarly productivity, institutional strength, and international collaboration, while intra-African research partnerships remain relatively underdeveloped.

The dominance of a small group of prolific authors and a concentration of research activity in a few institutions suggest both leadership and dependency structures within the field. Although global collaborations with Europe and North America have enhanced research visibility and quality, regional integration within Africa still lags. Addressing these disparities is essential for building a more balanced and sustainable research ecosystem that supports knowledge exchange, innovation, and the integration of traditional medicine into formal healthcare systems.

Recommendations

To enhance the development and visibility of African Traditional Medicine (ATM) research, stronger intra-African collaboration is essential. Governments, universities and funding agencies should prioritise South-South cooperation through multi-country projects, research exchanges and regional research consortia. Such initiatives will foster knowledge sharing, resource pooling and the creation of a sustainable research culture across the continent, helping to address the current imbalance where research activity is concentrated in a few countries, particularly South Africa.

Institutional capacity building remains critical. Many African universities and research centres face constraints in infrastructure, funding and human resources. Targeted investments in laboratory facilities, training and mentorship programmes are needed to empower emerging scholars and establish local centres of excellence capable of producing high-impact research.

Policy and funding support should be strengthened by integrating traditional medicine into national science, technology and innovation agendas. Dedicated funding streams and long-term grants for interdisciplinary projects will sustain research continuity and facilitate the

validation and standardisation of traditional medicines for wider healthcare use.

Promoting knowledge sharing and data integration through open-access repositories, regional bibliographic databases and collaborative digital platforms will improve research accessibility, reduce duplication and enhance global visibility. These platforms can also help track research impact and inform evidence-based policies.

Lastly, fostering interdisciplinary collaboration and community engagement is vital. Partnerships among traditional healers, biomedical scientists, pharmacists and policymakers can ensure quality assurance, safety and the effective integration of traditional medicines into formal healthcare systems. Future bibliometric and scientometric studies should examine citation impact, thematic evolution, funding trends and equity dimensions, particularly gender representation, to better understand the inclusivity and sustainability of ATM research networks.

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