Information Research Communications, 2024; 1(3):251-260.
https://inforescom.org

Research Article

Highly Cited Research on Medicinal Plants from India: A Scientometric Insight into Trends, Impact, and Influence

Chaman Sab M[1], Mueen Ahmed K.K[2,*], Vitthal Bagalkoti[3]

[1]A.R.G. College of Arts and Commerce, Davanagere, Karnataka, INDIA.
[2]Manuscript Technomedia, No. 9, St. Thomas Town, Bangalore, Karnataka, INDIA.
[3]CMR University, Bangalore, Karnataka, INDIA.

ABSTRACT

Aim and Background: The present study examines the Scientometric Insight into Trends, Impact, and Influence of Highly Cited Research on Medicinal Plants from India. **Methodology:** The study retrieved and identified highly cited papers related to India's scientometric research from the Web of Science citation database using a predefined search strategy covering 2021-2024. For each downloaded record, the data elements included publication type, citation count, author count, institutional affiliations, country or origin, and funding sources. Microsoft Excel was then used to analyze the data and examine collaborative connections among organizations, authors, and keywords. 4,396 were recognized from India. **Results:** Among these 59 were HCPs received 1065 to 100 citations, collectively received. The citation range of these HCPs is as follows 59 papers. This comprehensive bibliometric analysis provides an in-depth and enlightening overview of significant articles, journals, authors, institutions, and themes in the field. **Conclusion:** Through this overview by utilizing these valuable insights, researchers can swiftly grasp the present state, focal points, and emerging patterns of bibliometric research in India during the thought the last five years. To improve the future, the community should strive to foster interdisciplinary and international cooperation among Indian scholars and organizations.

Keywords: Medicinal Plants, Highly cited, Web of Science, Research Trends, India.

Correspondence:
Dr. Mueen Ahmed KK
Manuscript Technomedia, No. 9, St. Thomas Town, Bangalore, Karnataka, INDIA.
Email: mueen.ahmed@gmail.com

Received: 04-12-2024;
Revised: 18-02-2025;
Accepted: 07-05-2025.

INTRODUCTION

Medicinal plants have been an integral part of healthcare systems worldwide, particularly in India, which has a rich tradition of using herbal medicine as part of Ayurveda, Siddha, and Unani systems. With an estimated 8,000 medicinal plant species, India plays a crucial role in global phytochemical and pharmacological research (Levy 2022). The increasing scientific attention toward medicinal plants has resulted in a surge of publications, with many studies focusing on their pharmacological properties, bioactive compounds, and therapeutic applications (Chaman Sab, Kappi, and Mueen Ahmed 2022). Highly cited research papers in this field indicate key contributions that have significantly influenced the scientific community and shaped future research directions. Citations serve as a measure of the impact and relevance of scientific work, reflecting how often a particular study is referenced by researchers in the field. Highly cited papers often contribute to the foundation of emerging research areas, guiding further studies and applications (Alarcon-Ruiz *et al.*, 2023; Trivedi *et al.*, 2022). In the context of medicinal plants, such papers provide critical insights into ethnopharmacology, phytochemical composition, and clinical applications (Mishra, Gupta, and Shree 2020). A scientometric analysis of highly cited research offers a systematic understanding of publication trends, influential authors, collaborative networks, and dominant research themes. Several scientometric studies have explored the landscape of medicinal plant research in India and globally (Gupta, Mueen Ahmed, and Gupta 2018). For instance, (Jin, Lu, and Fan 2022). Analysed publications from 2000 to 2020 and identified a growing emphasis on the pharmacological applications of Indian medicinal plants, particularly in cancer and diabetes treatment. Similarly, a bibliometric analysis by Reddy and Singh (2022) highlighted the role of Indian institutions and researchers in advancing herbal medicine studies (Rattis, Ramos, and Celes 2021). Their study revealed that collaborations with international institutions have significantly contributed to the visibility and impact of Indian medicinal plant research. Furthermore, a recent study by (Bhatt and Pujari 2024) focused on research trends in ethnopharmacology, emphasizing the role of traditional knowledge in modern drug discovery (Chaman Sab M, Dharani Kumar, P, Biradar 2018). The study demonstrated that medicinal plant research is increasingly interdisciplinary, incorporating advances in biotechnology, nanotechnology, and

OPEN ACCESS
ScienScript

DOI: 10.5530/irc.1.3.26

Publishing Partner : ScienScript Digital. [www.scienscript.com.sg]

bioinformatics to enhance the efficacy and applicability of herbal compounds.

REVIEWS OF LITERATURE

(Senthamilselvi *et al.*, 2020) studies to the publication status and growth of Hantavirus and Coronavirus research in India. A quantitative and qualitative assessment was conducted by analysing various features of research output based on the Scopus online database for the period 1975-2020. The study provides insights into research trends, author productivity, and collaborative networks in this field. (Daza *et al.*, 2024) found that the total number of highly cited studies related to Covid-19 peaked at the end of 2021 and showed a downward trend until the end of 2022, Additionally, the origin of these studies shifted from China to the US and the UK, reflecting the evolving research landscape and scientific contributions from different regions. (Malik 2011) Studies that the Islamic world accounts for 1,338 (2,58%) of the world's highly cited papers in medical fields, showing a rising trends from 2007-1=2017. The study highlights the increasing research output and impact of scholars from the Islamic world in medical science, emphasizing their growing contributions to global health research. (Rahaman *et al.*, 2021) Studied the articles published in the web of science under the keyword "Medicinal plants" The search identified highly cited papers (cited more than 100 times) during the period 1989-2021. The analysis focused on citation patterns influential researchers, and emerging research areas in medicinal plant studies. (Rahaman *et al.*, 2021) The primary purpose of this research was to analyse the research output on medicinal plants by Indian researchers from 1977 to 2020 through a bibliometric perspective, the study identifies major contributors, key institutions, and research trends in this field, highlighting India's role in medicinal plant research. (Rattis *et al.*, 2021) Highlights that scientometric analysis underscores the burgeoning professional domain of curcumin–based treatment for COVID-19. Ongoing studies have focused on the antiviral activity of curcumin and its immunomodulatory effects on inflammatory cytokine storms. The paper provides a detailed assessment of research trends, citation impact, and potential applications of curcumin in covid1-19 treatment. These studies collectively offer valuable insights into the research landscape of infectious disease, medicinal plants, and vaccine development, emphasizing the significance of bibliometric and scientometric analyses in assessing scientific progress and global research contributions.

OBJECTIVES OF THE PRESENT STUDY

Building on these prior works, the present scientometric study aims to provide an in-depth analysis of highly cited research on medicinal plants from India.

The key objectives include:

Identifying the most cited research papers in the field of Indian medicinal plants.

Mapping the key research themes and subject areas receiving high scholarly attention.

Analysing the contributions of leading authors, institutions, and journals.

Understanding collaboration patterns at national and international levels.

Evaluating the overall impact of Indian medicinal plant research on global scientific knowledge.

METHODS AND TECHNIQUES

Data Collection

For the present analysis, data from the Web of Science Core Collection (WoS) (Bellis 2009) which includes the Science Citation Index Expanded (SCIE), Social Science Citation Index (SSCI), and Arts and Humanities Citation Index (AHCI) was retrieved on January 12, 2025. The search was limited to the "Title" subject field to ensure higher precision in identifying relevant studies directly addressing the research focus. Title searches are more precise than other search methods because they focus on author-controlled=, concise titles, allowing researchers to target directly relevant publications quickly and save time (Gusenbauer 2022). The Boolean search string was used i.e., TS=("medicinal plants" AND "India"). The HCPs were considered as those that received 100 or more citations. The most productive authors and institutions were those that contributed a maximum more than the average number of publications the most impactful authors and institutions were those that had registered Citations per Paper (CPP) and Relative Citation Index (RCI) more than their average (Donthu *et al.*, 2021).

Bibliometric tools and analysis

This analysis employs diverse tools to process and enhance the data and create visual representations. Microsoft Excel 2019 (v16.0) is used for primary data cleansing, filtering, and statistical analysis tools. Various scientometric software packages are also utilized to facilitate data visualization and mapping. These software packages encompassed a range of functions.

Biblioshiny (v4.1.3)

This tool developed by Aria and Cuccurullo (2017), visualizes citation networks, maps research trends, and analyses publication metrics. These biblioshily tools were used to identify key research themes, track citation patterns, and evaluate trends in this study.

VOSviewer (v1.6.18)

The visualization software developed by the Centre for Social and Technology Studies at Leiden University (van Eck and Waltman 2010) was used to analyze data and create visual maps of

co-authorship networks and author keywords. The collaboration criterion for including authors was a minimum of co-authorship with at least one other author centrality, a measure of node influence based on collaboration frequency was used to assess the prominence of each author in the network. This tool encompasses a comprehensive set of bibliometric methods for analysis, making it a valuable resource for our study. In co-citation networks, two items appear together in the Bibliography of a third citing item co-occurrence networks represent relationships between items based on their frequency of appearance together in publications. Visualizations use nodes and links of various colors, with node size reflecting citation of occurrence count and link strength quantified by the Total Link Strength (TLS) parameter. Our present study utilized the detailed flow diagram provided in Figure 1.

Overall Picture of the 30,614 global papers indexed in the Web of Science database Medicinal Plants from 2020-2024 on January 12, 2025, only 4,396 were recognized from India. Among these 59, HCPs received 1065 to 100 citations collectively. The citation range of these HCPs is as follows: 59 papers. This study on highly cited research on medical plants from India highlights the country's significant contributions to this field through extensive research output, strong institutional involvement, and global collaborations, Leading institutions such as Banaras Hindu University and Jmiya Millia Islamia play a crucial role, while a partnership with countries like USA and China enhance research impact. The study reveals key focus areas, including pharmacology, ethnobotany, and phytochemistry, with an interdisciplinary approach integrating traditional and modern science. Despite challenges like limited commercialization and translation gaps, India's research in medicinal plants holds great potential for further growth.

Most Productive and Impactful Countries

Table 1 indicates country collaboration publications. India leads the research landscape in medicinal plant studies, contributing to all 59 highly cited papers, with a total of 10,884 citations and an H-index of 59. This reflects India's dominant role in this field. Among international collaborators, Saudi Arabia (12 papers, 20.34%) and China (9 papers, 15.25%) emerge as key partners, indicating strong research ties. The USA, despite collaborating in only six papers (10.17%), has the second-highest total citations (2,094) and a high Average Citation per Paper (ACP) of 349, showcasing the global impact of its research contributions. South Korea and Chile exhibit remarkably high ACP values (574.5 and 594.5, respectively), suggesting that their contributions, though fewer in number, are highly influential. European countries such as Romania, Italy, and Portugal also show significant collaborations, with Portugal displaying the highest ACP (433.67), indicating strong research quality. Countries like Iran (431 ACP) and Pakistan (240.33 ACP) have a moderate number of collaborations but high citation impacts, pointing to valuable contributions in specific research areas. The collaboration network, as indicated by Total Link Strength (TLS), highlights India's extensive research partnerships, particularly with Saudi Arabia (TLS: 37) and China (TLS: 34), reinforcing the role of international alliances in advancing medicinal plant research. Overall, the analysis underscores the growing global interest in India's medicinal plant research and the impact of strategic collaborations on high-quality scientific output.

In Figure 2, VOSviewer visualization represents international research collaborations, with India being the most dominant contributor, having extensive connections with multiple countries. Strong collaborations exist between India and countries like China, USA, South Korea, and Germany, indicating significant scientific cooperation. The network also highlights emerging partnerships with countries such as Egypt, Malaysia, and South Africa. The varying node sizes represent the volume of research output, while the connecting lines depict collaborative intensity. This visualization underscores India's central role in global research networks, fostering both regional and international partnerships.

Leading Organisations

Table 2 illustrates the most productive organizations. The Council of Scientific and Industrial Research (CSIR), India, leads institutional contributions with six highly cited papers (10.17% of the total), accumulating 1,243 citations and an average citation per paper (ACP) of 207.17, highlighting its strong influence in medicinal plant research. Among academic institutions, Banaras Hindu University (BHU) and Majmaah University (Saudi Arabia) have contributed to three highly cited papers each, both receiving 486 citations with an ACP of 121.5, indicating international collaborations. Similarly, the Indian Council of Agricultural Research (ICAR), another major research body, has three papers with 480 citations (ACP: 160), showing its significant role in agricultural and medicinal plant studies. Universities such as Jamia Millia Islamia (India) and Jamia Hamdard University (India), both with three and two highly cited papers respectively, show considerable contributions, with Jamia Millia Islamia accumulating 360 citations (ACP: 120) and Jamia Hamdard University with 212 citations (ACP: 106). Their involvement highlights the importance of interdisciplinary research in herbal medicine. Savitribai Phule Pune University follows with three publications and 331 citations (ACP: 110.33), reflecting its growing impact. Internationally, Ben-Gurion University (Israel) has collaborated on two influential papers, garnering 229 citations (ACP: 114.5), while Al Hada Taif Military Hospital (Saudi Arabia) contributed a single highly cited study with 108 citations, reflecting global interest in India's medicinal plant research. Bharath Institute of Higher Education and Research (India) stands out with an impressive ACP of 252, the highest in the table, indicating the strong impact of its limited but highly influential research contributions. Several

Table 1: Contribution of the top 20 countries to highly cited publications.

Sl. No.	Countries/Regions	TP	% of 59	TC	CCP	H Index	TLS
1	India	59	100	10,884	184.47	59	114
2	Saudi Arabia	12	20.339	1,699	141.58	12	37
3	Peoples R China	9	15.254	1,986	220.67	9	34
4	South Korea	7	11.864	1,149	574.5	2	26
5	USA	6	10.169	2,094	349	6	24
6	Romania	5	8.475	1,633	326.6	5	40
7	Italy	4	6.78	1,462	365.5	5	34
8	Bangladesh	3	5.085	724	241.33	3	10
9	Iran	3	5.085	1,293	431	3	29
10	Malaysia	3	5.085	529	176.33	3	9
11	Nigeria	3	5.085	390	130	3	26
12	Norway	3	5.085	390	130	3	11
13	Pakistan	3	5.085	721	240.33	3	25
14	Poland	3	5.085	367	122.33	3	21
15	Portugal	3	5.085	1,301	433.67	3	31
16	Taiwan	3	5.085	698	232.67	3	8
17	Chile	2	3.39	1,189	594.5	2	24
18	Egypt	2	3.39	293	146.5	2	5
19	England	2	3.39	263	526	2	7
20	Germany	2	3.39	310	155	2	8

other universities, including Jadavpur University (422 citations, ACP: 211), Vellore Institute of Technology (376 citations, ACP: 188), and JSS Academy of Higher Education and Research (234 citations, ACP: 117), have also made substantial contributions. Karnatak University (284 citations, ACP: 142) and Presidency University Kolkata (229 citations, ACP: 114.5) further highlight the role of Indian institutions in advancing medicinal plant research. The Total Link Strength (TLS) metric, which reflects the strength of institutional collaborations, shows that Majmaah University (TLS: 26) and JSS Academy of Higher Education and Research (TLS: 21) have the strongest research networks. Jamia Millia Islamia (TLS: 13) and Jamia Hamdard University (TLS: 13) also exhibit strong inter-institutional ties, indicating extensive collaborations.

In Figure 3, VOSviewer visualization represents institutional collaborations in research. Major institutions such as Banaras Hindu University, Savitribai Phule Pune University, Jamia Millia Islamia, and the Chinese Academy of Sciences have strong research networks. Majmaah University and King Khalid University appear as well-connected nodes, indicating high collaboration within their network. The presence of diverse institutions from India, China, Saudi Arabia, Bangladesh, and Romania suggests global partnerships. The varying node sizes and cluster colors indicate different research intensity levels, highlighting the leading institutions in collaborative research efforts.

Author Collaboration

Table 3 shows that the most collaborative authors, highlights key contributors to highly cited research on medicinal plants from India, showcasing the number of publications, citation impact, and collaboration strength. Among the most productive authors, Anand U (Ben Gurion University) and Dey A (Presidency University) have both contributed two highly cited papers (3.448% each of the total 58 papers), accumulating 224 total citations with an Average Citation per Paper (ACP) of 112 and a Total Link Strength (TLS) of 16, indicating a moderate collaboration network. Similarly, Khan J (Majmaah University) has two papers, but with a slightly higher total citation count (269) and ACP (134.5), along with the highest TLS (32), reflecting a strong research network. Among Indian authors, Kumar V (PES Modern College, Pune) and Roy A (National Institute of Food Technology Entrepreneurship and Management) have also contributed two papers each, with Roy A having a higher ACP (140) compared to Kumar V (106 ACP), indicating greater research impact. Rudrapal M (Vignan's Foundation for Science, Technology and Research) stands out with 369 total citations and an ACP of 123, the highest among authors with multiple papers, along with a h-index of 3 and TLS of 32, showing a robust research presence. Several authors have contributed a single highly cited paper but with significant citation impact. Al-khayri JM and Al-musallem MQ (King Faisal University) have the highest citation counts

(337 each) among single-paper authors, demonstrating the global significance of their work. Al-sheikh H (King Faisal University), Al Alsheikh HM (King Saud University), and Ahmad I (King Khalid University) also have high citation counts ranging from 135 to 153, reinforcing the role of Saudi Arabian institutions in collaborative medicinal plant research. Authors from Indian institutions like Jamia Hamdard University, Lovely Professional University, and Government College University Faisalabad have contributed single publications, each receiving 104 to 112 citations, with moderate research impact. Their involvement reflects the growing interdisciplinary and inter-institutional collaborations within India and abroad. The Total Link Strength (TLS), which represents the collaboration network, is highest for Khan J (TLS: 32) and Rudrapal M (TLS: 32), suggesting strong international and institutional partnerships. Other key authors like Ajaz Ahmad (King Saud University, TLS: 26) and Al-khayri JM (TLS: 38) demonstrate extensive research linkages, further strengthening the global footprint of medicinal plant research.

Figure 4 shows that the map of VOSviewer visualization represents the co-authorship network of researchers, highlighting collaborative relationships in the field. The colored clusters indicate different research groups or collaboration networks, with prominent authors such as Calina, Daniela, Martorell, Miquel, Khan, Johra, and Dey, Abhijit forming key hubs of collaboration. The size of the nodes represents the influence or contribution of an author, while the connecting lines indicate co-authorship links. Densely packed clusters suggest strong collaborative efforts among specific groups, while isolated nodes indicate researchers with fewer co-authors. The distribution of colors shows the interdisciplinary nature of the research, with multiple institutions and geographic regions contributing to the field.

Leading Sources

Table 4 analysis of productive sources in highly cited research on medicinal plants from India reveals that Frontiers in Pharmacology is the most influential journal, contributing four highly cited papers (6.89% of the total) with a remarkable Total Citation count (TC) of 1,075 and an average Citation per Paper (CPP) of 268.75. This highlights the journal's significant role in disseminating impactful pharmacological research related to medicinal plants. Biomedicine and Pharmacotherapy and Molecules follow each contributing three papers (5.17%). However, Molecules stands out with 1,010 total citations and a high CPP of 252.5, compared to Biomedicine and Pharmacotherapy, which has 419 citations (CPP: 139.67), indicating a greater research impact per publication. Other notable sources include Antibiotics (Basel), Pharmacological Research, Phytomedicine, Phytotherapy Research, Scientific Reports, and Trends in Food Science and Technology, each contributing two highly cited papers (3.448%). Among them, Scientific Reports has the highest citation count (371 citations, CPP: 185.5), followed by Trends in Food Science and Technology (308 citations, CPP: 154), and Phytotherapy Research (302 citations, CPP: 151), reflecting strong research influence in medicinal plant studies. Several other journals, including Biotechnology Advances, Environmental Chemistry Letters, Environmental Research, and Computers in Biology and Medicine, have contributed single but highly cited papers, with Biotechnology Advances and Environmental Chemistry Letters having the highest individual paper impact (CPP: 205 and 206, respectively). The presence of multidisciplinary journals such as Scientific Reports and Environmental Research suggests a broad scientific interest in medicinal plant studies, encompassing fields like pharmacology, biotechnology, and environmental sciences. This distribution of highly cited papers across various journals

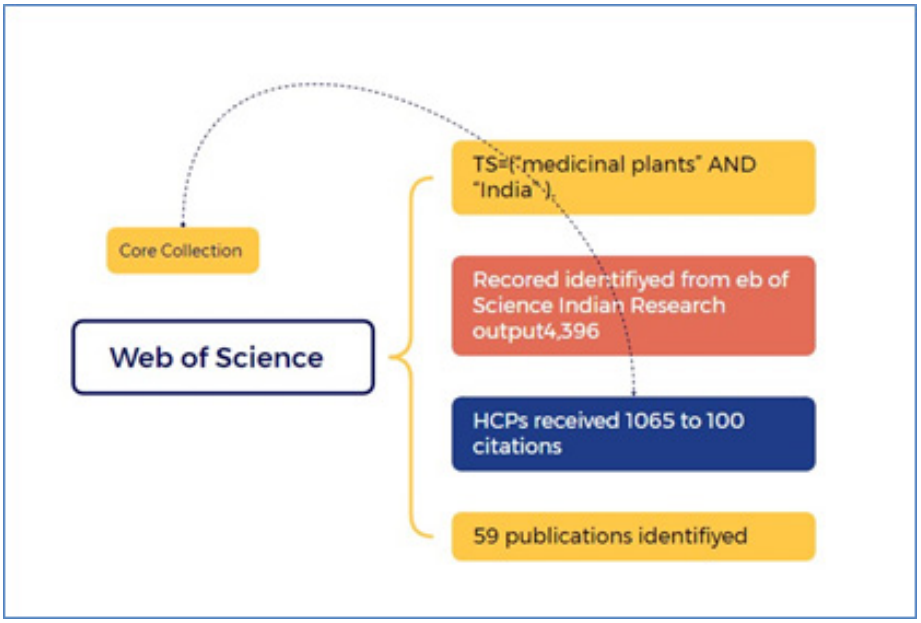

Figure 1: HCPs on Indian Medicinal Plants flow chart used for this Scientometrics Study.

Table 2: Top 20 Most Productive Impactful Organisations.

Sl. No.	Affiliations	Record Count	%	TC	ACP	TLS
1	Council of Scientific Industrial Research CSIR India	6	10.169	1,243	207.17	7
2	Banaras Hindu University (BHU)	3	5.085	486	121.5	1
3	Indian Council of Agricultural Research ICAR	3	5.085	480	160	10
4	Jamia Millia Islamia	3	5.085	360	120	13
5	Majmaah University	3	5.085	486	121.5	26
6	Savitribai Phule Pune University	3	5.085	331	110.33	14
7	Academy of Scientific Innovative Research ACSIR	2	3.39	227	113.5	4
8	Alagappa University	2	3.39	321	160.5	5
9	Ben Gurion University	2	3.39	229	114.5	3
10	Bharath Institute of Higher Education Research	2	3.39	504	252	3
11	Guru Nanak Dev University	2	3.39	219	109.5	5
12	Jadavpur University	2	3.39	422	211	9
13	Jamia Hamdard University	2	3.39	212	106	13
14	JSS Academy of Higher Education Research	2	3.39	234	117	21
15	Karnatak University	2	3.39	284	142	2
16	Presidency University Kolkata	2	3.39	229	114.5	12
17	Vellore Institute of Technology VIT	2	3.39	376	188	6
18	VIT Vellore	2	3.39	376	188	0
19	Al Hada Taif Mil Hosp	1	1.695	108	108	3
20	Amity University Noida	1	1.695	120	120	2

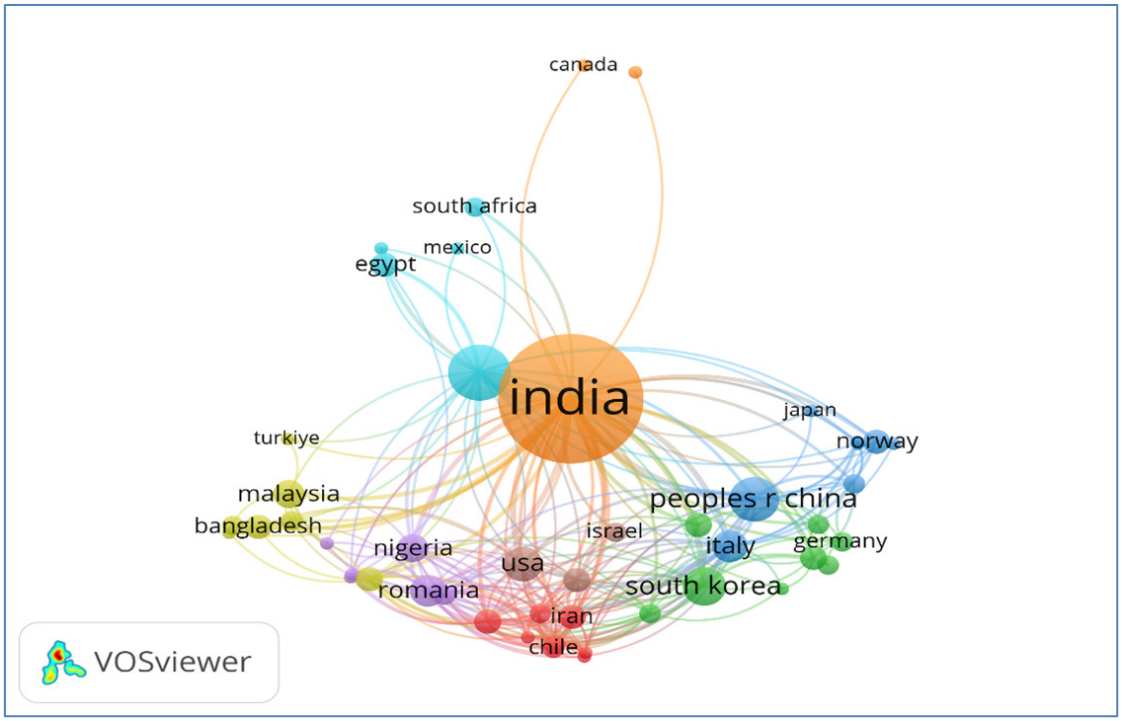

Figure 2: Co-authorship network map of 30 participating countries.

Table 3: Collaboration Network map of the top 20 productive organizations.

Sl. No.	Authors	Affiliations	TP	% of 58	TC	ACP	h index	TLS
1	Anand U	Ben Gurion University	2	3.448	224	112	2	16
2	Dey A	Presidency University	2	3.448	224	112	2	16
3	Khan J	Majmaah University, College of Applied Medical Sciences	2	3.448	269	134.5	2	32
4	Kumar V	PES Modern College of Arts, Science and Commerce, Ganeshkhind, Pune	2	3.448	202	106	2	9
5	Roy A	Natl Inst Food Technol Entrepreneurship and Managem	2	3.448	280	140	2	10
6	Rudrapal M	Vignan's Foundation for Science, Technology and Research	2	3.448	369	123	3	32
7	Adhikary S	Chettinad Hosp and Res Inst CHRI	1	1.724	120	120	1	10
8	Ajaz Ahmad	King Saud University (KSU), College of Pharmacy	1	1.724	104	104	1	26
9	Ahmad FA	Sch Engn and Scigurugram, Hariyana, India	1	1.724	108	108	1	22
10	Ahmad I	King Khalid University Abha, Kingdom of Saudi Arabia	1	1.724	153	153	1	22
11	Ahmad M	Jamia Hamdard University	1	1.724	104	104	1	22
12	Ahmad MF	Jazan University, Faculty of Applied Medical Sciences	1	1.724	108	108	1	22
13	Ahmad P	Lovely Professional University, GDC Pulwama	1	1.724	104	104	1	22
14	Ahmad S	Jamia Hamdard University	1	1.724	104	104	1	22
15	Akram M	Government College University Faisalabad	1	1.724	112	112	1	14
16	Al Alsheikh HM	King Saud University	1	1.724	135	135	1	26
17	Al-khayri JM	King Faisal University	1	1.724	337	337	1	38
18	Al-mssallem MQ	King Faisal University	1	1.724	337	337	1	33
19	Al-sheikh H	King Faisal University	1	1.724	135	135	1	22
22	Alghamdi S	Umm Al-Qura University	1	1.724	153	153	1	20

highlights the interdisciplinary nature of medicinal plant research and its growing recognition in traditional pharmacological studies and emerging fields like food science, environmental research, and computational biology.

Figure 5 shows that the map of VOSviewer visualization highlights the most influential journals publishing highly cited research on medicinal plants. Frontiers in Pharmacology emerges as the most dominant source, represented by the largest red node, indicating its significant impact and citation strength. Frontiers in Physiology and Phytomedicine also hold strong positions, reflecting their importance in publishing research on medicinal plant-based therapeutics and physiological effects. Other notable journals, such as Pharmacological Research, Phytotherapy Research, Biotechnology Advances, and Biomedicine and Pharmacotherapy, contribute to the field with moderate citation influence. The network structure suggests interdisciplinary research, with journals spanning pharmacology, physiology, chemistry, microbiology, and food science, reinforcing the broad scientific interest in medicinal plant research. The varying node sizes and colors indicate different levels of citation impact and co-citation relationships among the sources, emphasizing the diverse research landscape of this field.

DISCUSSION

The study on highly cited research on medicinal plants from India provides a comprehensive analysis of the most influential contributions in this field, highlighting the impact of Indian researchers and institutions in global scientific literature. By employing bibliometric and scientometric techniques, the study examines citation patterns, leading authors, key journals, collaborative networks, and institutional contributions (Gupta and Bala 2011; Mallikarjun kappi 2017). The findings reveal that India has made significant strides in medicinal plant research, with major contributions from universities such as Banaras Hindu University, Savitribai Phule Pune University, and Jamia Millia Islamia, among others. The visualization of co-authorship networks and institutional collaborations demonstrates strong national and international research ties, with partnerships extending to countries like China, the USA, South Korea, and Germany. The clustering of research topics suggests dominant themes such as phytochemistry, pharmacology, and ethnobotany,

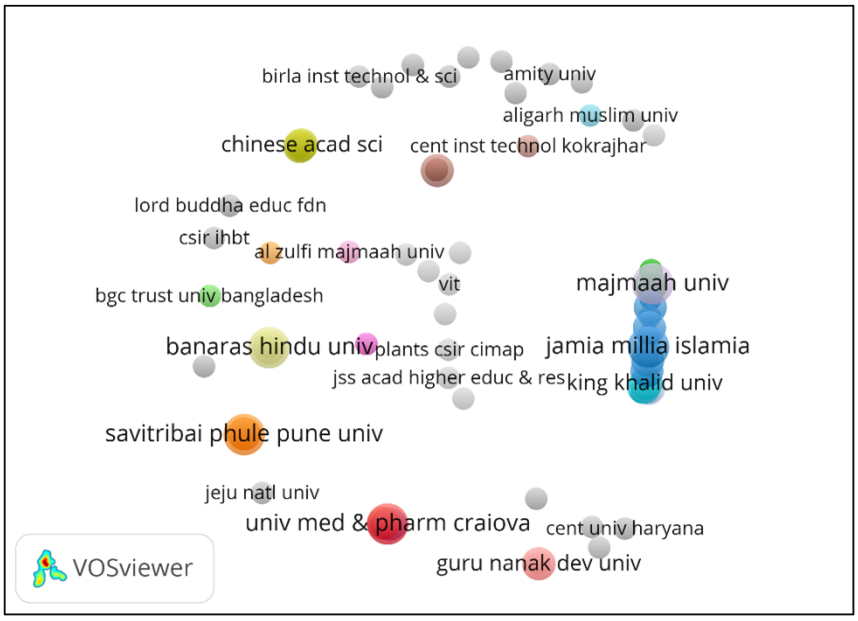

Figure 3: Most productive institutions network-based visualization by using VOSviewer.

Table 4: Top 20 Most Prolific Sources with Impact Factor.

Sl. No.	Publication Titles	TP	% of 58	TC	CPP	h index	IF
1	Frontiers In Pharmacology	4	6.897	1,075	268.75	4	1.15
2	Biomedicine Pharmacotherapy	3	5.172	419	139.67	4	1.56
3	Molecules	3	5.172	1,010	252.5	4	0.69
4	Antibiotics Basel	2	3.448	252	126	2	1.06
5	Pharmacological Research	2	3.448	228	114	2	2.12
6	Phytomedicine	2	3.448	221	110.5	2	2.03
7	Phytotherapy Research	2	3.448	302	151	2	2.03
8	Scientific Reports	2	3.448	371	185.5	2	1.05
9	Trends In Food Science Technology	2	3.448	308	154	2	2.64
10	Archives of Pharmacal Research	1	1.724	104	104	1	1.26
11	Biomed Research International	1	1.724	154	154	1	0.6
12	Biomolecules	1	1.724	110	110	1	0.79
13	Bioresource Technology	1	1.724	128	128	1	0.6
14	Biotechnology Advances	1	1.724	205	205	1	1.61
15	Computers In Biology and Medicine	1	1.724	160	160	1	1.8
16	Current Pharmaceutical Biotechnology	1	1.724	127	127	1	0.51
17	Current Topics in Medicinal Chemistry	1	1.724	112	112	1	0.54
18	Environmental Chemistry Letters	1	1.724	206	206	1	1.18
19	Environmental Research	1	1.724	151	151	1	1.96
20	Food Bioscience	1	1.724	120	120	1	1.09

reflecting India's rich biodiversity and traditional knowledge systems like Ayurveda. The study also identifies highly cited papers (Gupta *et al.*, 2024; Gusenbauer 2022; Vaishya *et al.*, 2024), prominent authors, and key funding agencies supporting this domain. The increasing citations indicate the growing relevance of medicinal plant research in drug discovery, herbal medicine, and natural product chemistry. However, the study also highlights the need for increased interdisciplinary collaborations, stronger international partnerships, and more funding to further enhance research impact. Overall, the study provides valuable insights into India's leadership in medicinal plant research and emphasizes

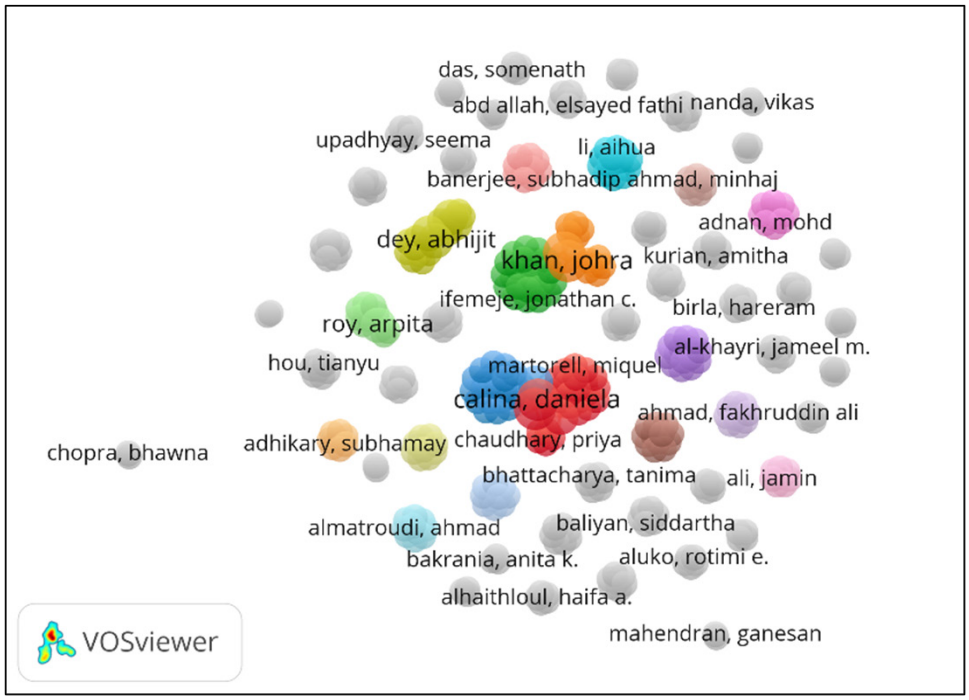

Figure 4: Top most productive authors network-based visualization by using VOSviewer.

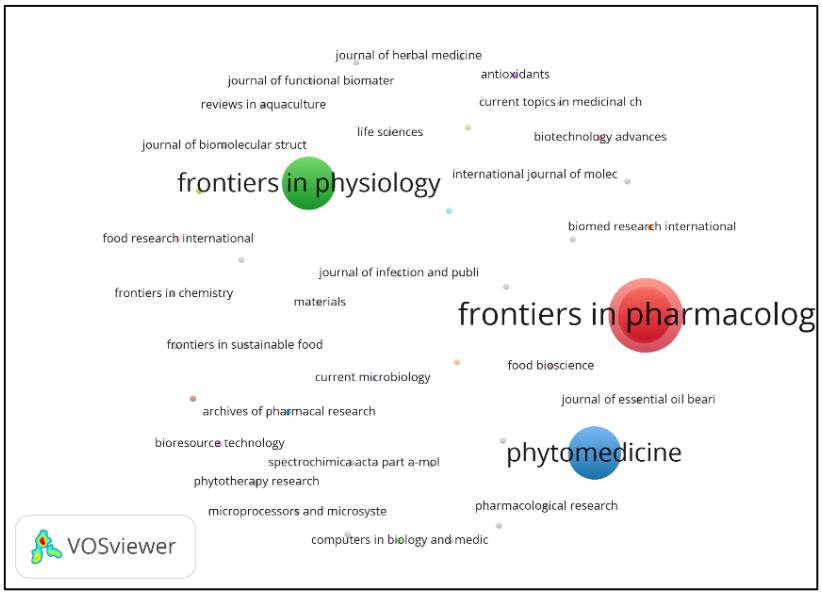

Figure 5: Collaboration Network Based Most Productive Sources visualization map.

the importance of continued investment in this field to drive innovation in herbal medicine and pharmaceutical sciences.

CONCLUSION

The study on highly cited research on medicinal plants from India provides valuable insights into the country's significant contributions to this field. The analysis highlights India's strong research output, particularly in collaboration with international institutions and researchers. The bibliometric and scientometric analysis demonstrates that Indian institutions, such as Banaras Hindu University, Jamia Millia Islamia, and Savitribai Phule Pune University, are leading contributors to this domain. Moreover, India's research collaborations with countries like the USA, China, and South Korea indicate the global recognition of its work in medicinal plant research. Highly cited authors and influential research clusters reveal a focus on pharmacological properties, ethnobotanical studies, and phytochemical investigations. The network analysis of keywords and co-authorship patterns suggests an interdisciplinary approach, integrating traditional knowledge with modern scientific methods. The findings also

highlight the role of funding agencies and institutional support in advancing research impact. However, challenges such as limited commercialization, gaps in translational research, and the need for stronger industry-academia partnerships remain. To enhance India's global influence in medicinal plant research, there is a need for increased investment in cutting-edge technologies, better documentation of indigenous knowledge, and more robust collaborations. This study underscores India's pivotal role in medicinal plant research and the potential for further advancements through strategic initiatives and policy support.

ACKNOWLEDGEMENT

The authors extend their heartfelt gratitude to the editorial team of [Information Research Communications] for their invaluable support and guidance throughout the publication process. Their meticulous review, insightful comments, and constructive suggestions have significantly enhanced the quality of this study. We deeply appreciate their dedication and efforts in ensuring a smooth and rigorous peer-review process.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

ABBREVIATIONS

TP: Total publications; **TC:** Total Citations; **CPP:** Citations per Paper; **IF:** Impact Factor; **TLS:** Total Link Strength; **ACP:** Average citation paper.

ORCID IDS

Dr. Chaman Sab M: https://orcid.org/0000-0002-7918-2243
Dr. Mueen Ahmed KK: https://orcid.org/0000-0002-6705-4949
Dr. Vitthal Bagalkoti: https://orcid.org/0000-0003-0217-2386

REFERENCES

Alarcon-Ruiz, C. A., Maguiña, J. L., Apolaya-Segura, M., Carhuapoma-Yance, M., Aranda-Ventrura, J., & Herrera-Añazco, P. (2023). Bibliometric analysis of medicinal plants' original articles from Latin America and the Caribbean region. Journal of Scientometric Research, 12(1), 79-91. https://doi.org/10.5530/jscires.12.1.011

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Bellis, d. N. (2009). Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics. Journal of the American Society for Information Science and Technology, 61(1), 205-207.

Bhatt, S., & Pujari, N. M. (2024). "Journal of Drug Discovery and Health Sciences Bridging Traditional Knowledge and Modern Ethnobotanical Research on Pongamia pinnata." 1(2):89-96. https://doi.org/10.21590/jddhs.01.02.04

Chaman, S. M., Kumar, D., P., & Biradar, B. (2018). Medicine research in India: A scientometric assessment of publications during 2009–2018. Library Philosophy and Practice (e-Journal) December : 2186.

Chaman Sab, M., Kappi, M., & Ahmed, K. K. M. (2022). Ethnopharmacology research: A scientometric assessment of Indian publications during 2011 to 2020. Journal of Pharmacology and Pharmacotherapeutics, 13(1), 48–58. https://doi.org/10.1177/0976500X221082839

Daza, A., Olivos-López, A. J., Chumbirayco Pizarro, M., Abad Escalante, K. M., Chavez Ortiz, P. G., Montes Apaza, R. D., Ruiz-Baca, J., & Sánchez-Chávez, J. P. (2024). Clinical applications of artificial intelligence in diabetes management: A bibliometric analysis and comprehensive review. Informatics in Medicine Unlocked, 50(August). https://doi.org/10.1016/j.imu.2024.101567

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133(May), 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Gupta, B. M., & Bala, A. (2011). A scientometric analysis of Indian research output in medicine during 1999–2008. Journal of Natural Science, Biology, and Medicine, 2(1), 87–100. https://doi.org/10.4103/0976-9668.82313

Gupta, B. M., Dhawan, S. M., Singh, Y., Srivastava, N., Vaishya, R., Kappi, M., & Mamdapur, G. M. N. (2024). A scientometric analysis of highly cited papers of Pakistan in COVID-19 research 2020-2023. Journal of Data Science, Informetrics, and Citation Studies, 3(2), 123-137. https://doi.org/10.5530/jcitation.3.2.15

Gupta, B. M., K K Mueen Ahmed, M. A., & Gupta, R. (2018). Glycyrrhiza glabra (medicinal plant) research: A scientometric assessment of global publications output during 1997-2016. Pharmacognosy Journal, 10(6), 1067-1075. https://doi.org/10.5530/pj.2018.6.180

Gusenbauer, M. (2022). Search where you will find most: Comparing the disciplinary coverage of 56 bibliographic databases. Scientometrics. Springer International Publishing, 127(5), 2683-2745. https://doi.org/10.1007/s11192-022-04289-7

Jin, H., Lu, L., & Fan, H. (2022). Global trends and research hotspots in long COVID: A bibliometric analysis. International Journal of Environmental Research and Public Health, 19(6), Article 3742. https://doi.org/10.3390/ijerph19063742

Kappi, M. (2017). "Scientometric Analysis of Pharmacognosy Magazine: A Decade of Quality Publishing." Chaman sab and Mueen Ahamed. Pharmacognosy Magazine, 13 (Suppl 62), 179–188. https://doi.org/10.4103/pm.pm

Levy, K. H. (2022). The value of contemporary BS-MD programs. Copyright © by Association of American Medical Colleges. Unauthorized Reproduction of This Article Is Prohibited. Shifting Medical Student Involvement in Curriculum Design: From Liaisons to Cocreators Copy." 97(5), 622.

Malik, T. G. (2011). Muslims and the medical research: Past, present, future. Oman Medical Journal, 26(6), 383–384. https://doi.org/10.5001/omj.2011.100

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. International Journal of Educational Research Open, 1(June), Article 100012. https://doi.org/10.1016/j.ijedro.2020.100012

Rahaman, M. S., Ansari, K. M. N., Tewari, L., & Shah, K. (2021). A bibliometric study of Indian medicinal plant research: An analysis of quality research papers based on the Web of Science. Qualitative and Quantitative Methods in Libraries, 10(4), 505–530.

Rattis, B. A. C., Ramos, S. G., & Celes, M. R. N. (2021). Curcumin as a potential treatment for COVID-19. Frontiers in Pharmacology, 12(May), Article 675287. https://doi.org/10.3389/fphar.2021.675287

Senthamilselvi, A., Surulinathi, M., Karthik, M., & Jayasuriya, T. (2020). Research output on coronavirus (Covid-19)/Hantavirus in India: A scientometric study. Library Philosophy and Practice, 2020.

Trivedi, G., Gupta, N. K., Kumar, V., Ramanathan, T., Bharadwaj, A., Gupta, S. K., Noviar, R. A., & Kumar, A. (2022). Top 100 most cited papers on medicinal plants research. International Journal of Health Sciences, 6(March), 5509–5528. https://doi.org/10.53730/ijhs.v6nS1.6106

Vaishya, R., Gupta, B. M., Mamdapur, G. M. N., Kappi, M., & Ali, K. S. (2024). Mapping the landscape of COVID-19 research from Bangladesh: A bibliometric analysis of highly cited papers. South Asian Journal of Health Sciences, 0(August), 1–9. https://doi.org/10.25259/SAJHS_7_2024

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Cite this article: Sab MC , Ahmed KKM, Bagalkoti V. Highly Cited Research on Medicinal Plants from India: A Scientometric Insight into Trends, Impact, and Influence. Info Res Com. 2024;1(3):251-60.