Science and Technology Publications Associated with the University of Mysore: A Bibliometric Examination Using Web of Science Database

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Abstract:

UoM (University of Mysore) reputations are significantly influenced by their publications. This bibliometric analysis, using VOSviewer, compiles Web of Science-indexed papers from the University of Mysore (UoM), India. The number of publications from UoM has been steadily increasing. In terms of international collaboration, UoM has partnered most frequently with institutions in China and India. Among UoM-affiliated authors, the most prolific author has published 104 articles. Authors associated with UoM who co-authored with fewer than 25 others had the highest number of cited publications. Currently, antioxidant activity is a major research focus at UoM. With an impressive record of 5,127 publications and extensive international collaborations with 36 countries, UoM demonstrates a strong global research presence.

Keywords: University of Mysore, Bibliometric Analysis, Web of Science, VOSviewer

1. Introduction

Scholarly conversations about institutional reputation have significantly increased over the last ten years, highlighting the increased understanding of its importance in academia. Assessing the output of researchers at higher education institutions is one of the most important ways to rank and evaluate these institutions. This covers a range of scholarly publications that share research findings, including book chapters, scientific papers, review articles, and conference proceedings. It is now essential to publish in respectable journals or with prestigious publishers, especially because of growing worries that some journals may be labeled as predatory, unethical, or dishonest(Raoul et al., 2024)(Panahi et al., 2023).

The Web of Science platform is widely recognized for its comprehensive coverage of reference and citation data across a broad range of disciplines, including the sciences, social sciences, arts, and humanities. It is particularly noted for indexing high-impact journals,

including open-access ones, and offers valuable metrics that provide insights for researchers (Panahi et al., 2023)(Ali et al., 2021).

The University of Mysore (UoM) has advanced significantly in science and technology over the last ten years. Among the notable accomplishments are:

1. **Research Output**: UoM researchers have published extensively, with a strong presence in high-impact journals. Key focus areas include chemistry, physics, and biological sciences.
2. **Citations and Impact**: The work of UoM faculty, such as researchers like Rangappa and Yathirajan, has garnered substantial global recognition, with thousands of citations(Chen et al., 2023).
3. **Collaborations**: The university has established multiple national and international research collaborations, which have enhanced the quality and reach of its research (Gayathri & Srinivasaragavan, 2024a).
4. **Technological Advancements**: UoM has incorporated modern technologies and methodologies, contributing to significant advancements across various scientific domains (Raoul et al., 2024).

These achievements reflect the University of Mysore's dedication to contributing to the global scientific community.

UoM's research efforts in science and technology have also been particularly impactful in the areas of chemical biology and drug discovery, notably through the work of Prof. K.S. Rangappa. His development of over 7,000 synthetic small molecules, some of which have shown potential in cancer treatment, exemplifies UoM's cutting-edge research (Joseph et al., 2023) (Luong et al., 2023).

Other notable achievements include the university's collaborative research initiatives involving over 300 scientists worldwide, with partnerships across countries like Japan, France, Germany, and the USA (Butt et al., 2021). Additionally, UoM researchers have published over 560 papers in peer-reviewed journals and hold ten patents in medicinal chemistry (Bufrem et al., 2023). Numerous prestigious awards, such as the Sir C.V. Raman Young Scientist Award and the Prof. Y.T. Thathachari Research Award, further highlight the excellence of UoM's scientific contributions (Arif et al., 2024).

UoM's research activity has been growing steadily, with an average annual growth rate of 23%, underscoring the university's commitment to fostering a robust research environment (Ishmuradova et al., 2023).

2. Literature Review

Citation analysis remains one of the most reliable methods for assessing the scholarly impact of publications and authors. (Lancaster, 1991) are seminal contributors to the field of bibliometrics, having developed citation indexes that are still in use today to measure the impact and productivity of researchers. Garfield's work, in particular, raised important questions about how citation counts shape the perception of scholarly influence, often described as the "tail wagging the dog" when undue emphasis is placed on these metrics (UoM).

Recent studies, such as those by Sylvia (Sylvia, 1998) and (Knievel & Kellsey, 2005), have expanded the scope of citation analysis by applying it to specific fields like psychology and the humanities. These studies illustrate that citation behavior is not uniform and varies significantly between disciplines(UoM). For instance, Sylvia's (1998) unobtrusive method of using student research bibliographies provides an innovative approach to assessing journal collections in libraries.

Bibliometric analysis has become a critical method for understanding research trends and scholarly impact across various academic fields. As research output continues to expand globally, bibliometric studies offer valuable insights into publication patterns, collaboration networks, and the influence of specific research topics or institutions. This literature review synthesizes key findings from recent bibliometric analyses, focusing on academic contributions, citation metrics, and trends across various disciplines, with an emphasis on the University of Mysore (UoM) and its research contributions within the Web of Science (WoS) database.

Several studies have demonstrated how bibliometric analyses can effectively track an institution's research output over time. For instance, (Arif et al., 2024b) (Arif et al., 2024a)explored social media's influence on academic performance, using bibliometric analysis to identify trends and outcomes in scholarly publications. Similarly, the study by Abayeva et al. (2023)(Abayeva et al., 2023) highlighted trends in ubiquitous learning through cross-database bibliometric analysis, showcasing how research influences can be mapped

across time. For the University of Mysore (UoM), a bibliometric examination over 11 years (2015-2025) reveals a fluctuating growth in publication output, with notable peaks and declines. The university's 5,127 Web of Science-indexed publications cover various fields, including science and technology. However, the AGR data suggests that UoM faces challenges in maintaining its growth in research output, with a sharp decline in publications between 2023 and 2025.

The analysis of bibliometric data often intersects with broader discussions on academic integrity, including issues of plagiarism. The study by LG, N., M, C., & P (2024)(LG et al., 2024) on "Trends in Plagiarism" adds a critical dimension to understanding how scholarly output and citation patterns can be affected by ethical considerations in academic publishing(UoM). The authors explore how plagiarism in scholarly publications impacts the integrity and reliability of citation analyses and bibliometric studies, highlighting a key concern for institutions aiming to improve their research reputation.

Studies focusing on specific institutions often draw attention to notable researchers and their impact within their academic communities. In the case of UoM, prominent researchers like Kanchugarakoppal Rangappa and Basappa have made significant contributions, with high publication counts and citations, aligning with findings from Heberger et al. (2010)(Heberger et al., 2010) that document and citation metrics can be used to assess scholarly impact. Similar studies, such as Butt et al. (2021)(Butt et al., 2021) and Cascajares et al. (2021)(Cascajares et al., 2021), have emphasized the importance of citation counts and normalized citations as indicators of research influence, which helps institutions like UoM to benchmark their contributions against global standards.

International collaboration is a crucial factor that influences the visibility and impact of research, and bibliometric mapping tools like VOSviewer have been instrumental in visualizing these networks. For example, Cevher (2023)(CEVHER, 2023) employed bibliometric analysis to explore how international collaboration enhances marketing research outcomes, underscoring the value of inter-institutional cooperation. In the case of UoM, the network analysis revealed a robust collaboration landscape, where researchers like Chakrabhavi Dhananjaya Mohan and Muthu K. Shanmugam stood out for their significant citation impact, as also noted in Gayathri and Srinivasaragavan's (2024)(Gayathri & Srinivasaragavan, 2024) study of research networks at Bharathidasan University.

The use of bibliometric tools has also highlighted emerging and high-impact researchers, as demonstrated by Joseph et al. (2023)(Joseph et al., 2023) and Panahi et al. (2023)(Chikate & Patil, 2008). In UoM's context, researchers like Muthu K. Shanmugam, with high normalized citation scores, illustrate how even newer scholars can have a strong influence within their fields. This aligns with the findings of Wang et al. (2023)(Wang et al., 2023), who discussed the critical role of emerging researchers in maintaining an institution's research productivity.

Keyword analysis in bibliometric studies has provided significant insights into the focus areas of various academic fields. For instance, Luong et al. (2023)(Luong et al., 2023) identified "social media" as a recurring theme in general education research, reflecting broader shifts in academic interests. Similarly, in UoM's bibliometric analysis, keywords such as "antioxidant activity," "dietary fiber," and "bioactive compounds" have emerged as dominant themes, indicating a strong focus on food science and health-related research. This mirrors findings by Khairullina et al. (2023)(Khairullina et al., 2023), who reported on key research themes in STEM education and the growing importance of health and nutrition in contemporary research.

The analysis of citation metrics and link strength has also revealed patterns of research impact across various fields. As noted by Sidhu et al. (2020)(Sidhu et al., 2020) and Sarikaya and Denis-Celiker (2022)(Sarikaya & Denis-Celiker, 2022), keywords with high link strengths, such as "antioxidant" in UoM's publications, indicate strong interdisciplinary connections and a wide research influence. Furthermore, the work by Hadiastriani (2022)(Hadiastriani, 2022) on analytical thinking in assessment research highlights how keywords related to health and nutrition are gaining prominence, with increased citations signaling the growing importance of this field in both academic and practical contexts.

While established institutions like UoM have made significant contributions to global research, challenges such as declining publication growth in recent years raise important questions about sustaining research momentum. Similar trends have been observed in other studies, such as the bibliometric overview by Ishmuradova et al. (2023)(Ishmuradova et al., 2023), which documented fluctuations in science communication research. For UoM, the sharp decline in publication output from 2023 to 2025, coupled with a decreasing AGR, points to potential barriers in research funding, collaboration, or institutional priorities, a

concern also raised by Utami et al. (2024)(Utami et al., 2024) in their study of Indonesian universities.

However, the presence of high-impact researchers and well-established collaborations offers UoM opportunities to revitalize its research ecosystem. As noted by Panahi et al. (2023)(Panahi et al., 2023), fostering new international partnerships and leveraging emerging research areas could help the institution overcome its current challenges. The bibliometric analysis of keyword trends, such as the prominence of "antioxidant activity" and "bioactive compounds," suggests that UoM could further capitalize on its strengths in health-related research to enhance its global standing.

The bibliometric analysis of UoM's publications in the Web of Science database reveals a dynamic yet fluctuating research landscape. While the institution has made substantial contributions to science and technology, particularly in food science and health, recent declines in publication output highlight the need for strategic interventions. By fostering collaborations, supporting emerging researchers, and focusing on high-impact research areas, UoM can strengthen its position in the global academic community, as similar institutions have done in response to challenges identified through bibliometric studies.

3. Objectives of the study

1. To assess the trends in research output from the University of Mysore (UoM) in science and technology by examining the quantity and categorization of publications indexed in the Web of Science from 2015 to 2025.
2. To evaluate the extent of international collaborations by analyzing publications co-authored by UoM researchers with institutions from various countries.
3. To identify and analyze the most prolific authors affiliated with UoM and assess their contribution to the university's overall research output.
4. To utilize VOSviewer visualizations to map out international collaborations, showing the relationships between UoM-affiliated researchers and their global partners.
5. To highlight emerging researchers and niche areas of study, with a focus on those with high impact despite a smaller number of publications.

4. Methodology

Figure 1 illustrates the study's structure, which utilized a bibliometric approach with data from the Web of Science to analyze publications by authors affiliated with the University of Mysore (UoM) from 2015 to 2025. The search term "Science and Technology AND University of Mysore" was applied, focusing solely on English-language publications. The study included various publication types such as articles (4,724), review articles (282), corrections (10), progress papers (5), and retracted publications (4). VOSviewer 1.6.18 was used to create visualizations of co-authorship, co-occurrence, and citation networks from the bibliographic data saved in CSV format, excluding publications with more than 25 authors or organizations. On network and overlay maps, circles represented authors, keywords, and organizations, with their size indicating the number of publications or keyword occurrences, and their proximity showing the relationships between these elements.

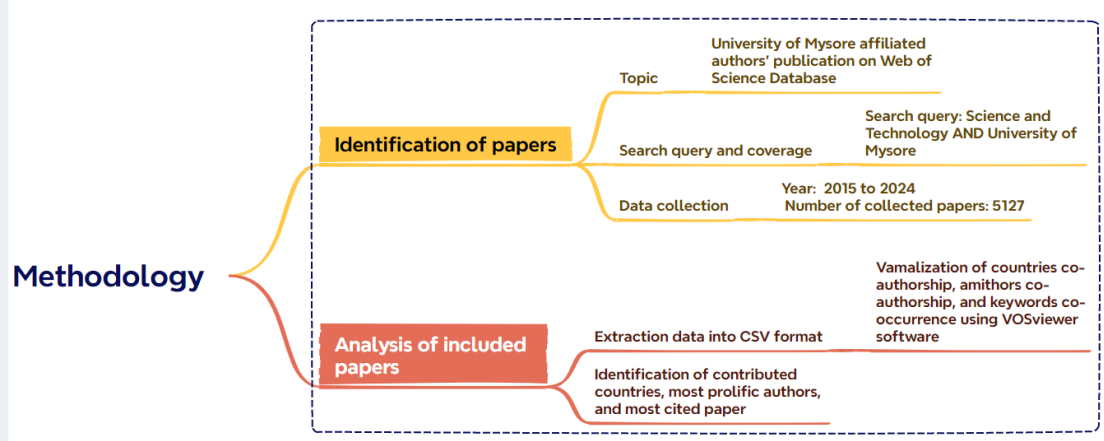

Figure 1: study's structure

5. Results and discussion

5.1 Publication Trends

Figure 2 summarizes 11 years of publications from 2015 to 2025, totaling 5,127 records. In 2015, there were 785 publications, accounting for 15.31% of the total. The following years saw fluctuations, with a decline to 454 publications in 2016 (8.86%), followed by slight increases to 501 in 2017 (9.77%), peaking at 580 in 2019 (11.31%). However, from 2020 onward, publication counts decreased, with 509 in 2020 (9.93%), 539 in 2021 (10.51%), and 524 in 2022 (10.22%). A significant drop occurred in 2023, with only 334 publications (6.52%), followed by 225 in 2024 (4.39%), and just 1 recorded in 2025 (0.02%). The cumulative count reached 5,021 by 2024, covering 97.85% of the total, though 105 records (2.048%) lack publication year information, indicating incomplete data.

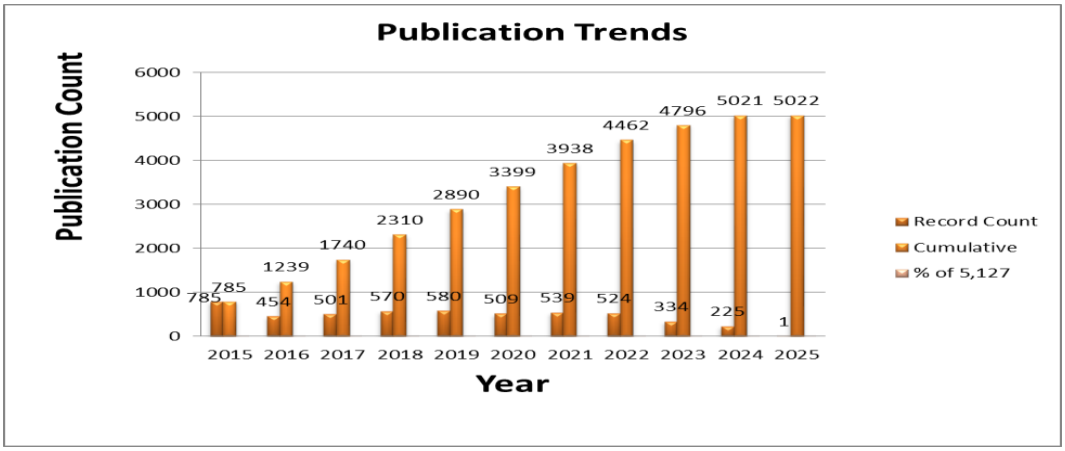

Figure 2. Publication trends of UoM-Affiliated authors.

Table 1 Annual growth rate of publication by UoM-affiliated authors

Year	Publication Count	Cumulative	AGR[1]
2015	785	785	15.311
2016	454	1239	8.855
2017	501	1740	9.772
2018	570	2310	11.118
2019	580	2890	11.313
2020	509	3399	9.928
2021	539	3938	10.513
2022	524	4462	10.22
2023	334	4796	6.515
2024	225	5021	4.389
2025	1	5022	0.02

105 record(s) (2.048%) do not contain data in the field being analyzed

Table 2 Top 10 collaborative countries by publication count

Sl No.	Country	PC	CC	TLS
1.	India	2369	45743	319
2.	People's Republic China	653	12892	108
1.	Iran	316	7073	248
2.	USA	249	6054	537
3.	Brazil	219	3679	190
4.	Turkey	213	3917	199
5.	Thailand	166	3447	159
6.	Malaysia	134	3257	133
7.	Saudi Arabia	120	2419	639
8.	South Korea	119	1983	337

AGR=annual growth rate PC= publication count CC=citation count TLS=Total Link Strength

5.2. Analyses of Contributing Countries and Collaborations

All publications came from 153 different countries. After excluding publications co-authored by more than 25 countries, the analysis was limited to 88 countries.

The table 1 shows the Annual Growth Rate (AGR) of publications by University of Manchester (UoM)-affiliated authors shows a clear trend over the years from 2015 to 2025. In 2015, there was a strong growth rate of 15.311%, but this rate gradually decreased over the following years, fluctuating between 8.855% and 11.313% until 2021. From 2022 onward, the growth rate took a notable dip, dropping to 6.515% in 2023 and further declining to

4.389% in 2024. The projections for 2025 indicate a drastic slowdown with an AGR of only 0.02%. Overall, while the total number of publications has reached 5022, the decreasing growth rates suggest that UoM researchers may be facing challenges that need to be addressed to maintain and enhance their research output

Table 2 lists the top ten countries with the most co-authored publications involving UoM-affiliated authors, highlighting the university's strong global collaboration network. India leads with 2,369 publications, demonstrating UoM's dominant domestic and international partnerships. China follows with 653 publications, reflecting a significant research alliance. Iran ranks third with 316 publications, indicating focused yet meaningful collaboration. The USA, with 249 publications, underscores a solid cross-national research relationship. Other key partners include Brazil, Turkey, and Thailand, showing UoM's growing presence in these regions. Notably, Malaysia ranks eighth with 3,257 collaborations, showcasing strong domestic ties, while Saudi Arabia and South Korea complete the top ten. Saudi Arabia, in particular, shows a notable collaboration relative to its publication count. Overall, these data highlight UoM’s extensive and diverse international research partnerships, especially in South and East Asia.

Figure 3. The largest set of connected authors with at least five publications authored by UoM- affiliated authors.

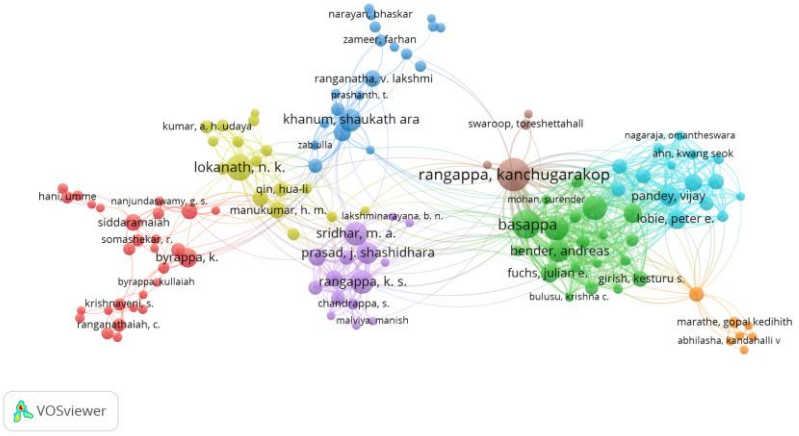

Figure 3 (a): VOSviewer network visualisation

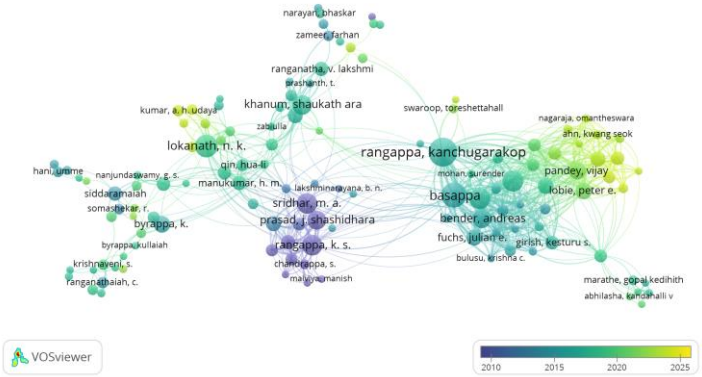

Figure 3 (b). VOSviewer overlay visualisation map

Figure 4. Largest set of connected countries on publications authored by UoM-affiliated authors.

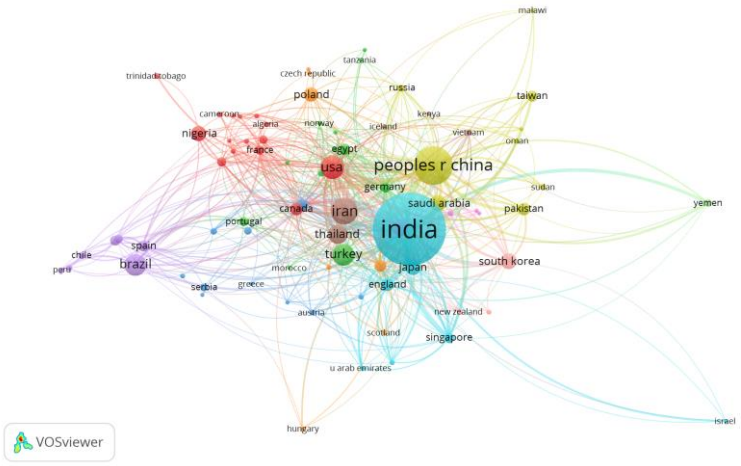

Figure 4(a): VOSviewer network visualisation map.

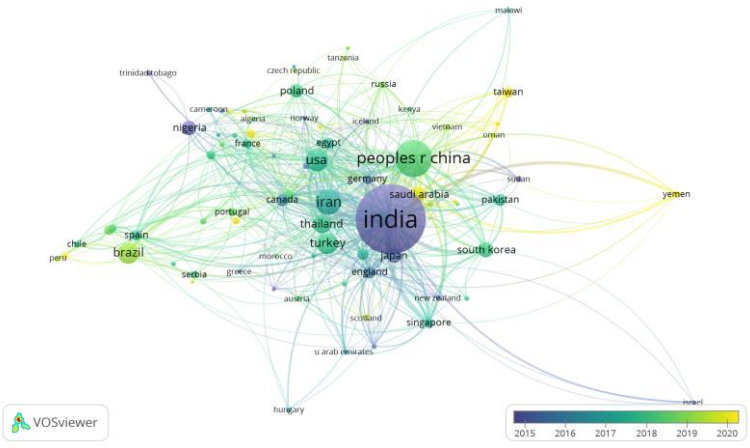

Figure 4(b): VOSviewer overlay visualisation map.

5.3. Analysis of Contributing Authors and Collaborations

The network visualization maps (Figure 3a and 3b) depict the complexities of international collaboration in scientific research based on recent publications. Key metrics analyzed include cluster membership, link weights, total link strength, number of documents, citations, and normalized citations, as well as average publication years and average citation scores. Among the standout contributors, Kanchugarakoppal Rangappa leads with 62 publications and 1,760 citations, establishing him as a prominent figure in the research network. Basappa, with 49 publications and 1,487 citations, also demonstrates significant scholarly influence.

***Document and Citation Metrics*:**

The analysis highlights variations in the impact of individual researchers. For example, Chakrabhavi Dhananjaya Mohan has accumulated 1,254 citations, reflecting strong recognition for his work. The disparity in citation counts illustrates the diverse levels of influence across different researchers. Normalized citations, which account for factors like publication age, offer insights into relative impact. Researchers like Muthu K. Shanmugam (normalized citation score of 2.0922) and Gautam Sethi (1.8713) show that even with fewer publications, their work has high relevance and impact across disciplines or in high-impact journals.

***Average Publication Year*:**

The average publication year metric indicates that most researchers have been actively publishing in recent years. For instance, Kempaiah Kemparaju and Vijay Pandey have an average publication year of 2021, suggesting their work is current. On the other hand, researchers like Rangappa and M.A. Sridhar, with average publication years around 2009, may have longer research careers or have produced their most cited work earlier.

***Emerging and High-Impact Researchers*:**

Emerging scholars, such as Muthu K. Shanmugam, have made a significant impact, with an average of 49.22 citations per publication despite having published only nine papers. This highlights the potential for newer researchers to significantly influence their fields.

Researchers with recent average publication years, such as Mahendra Madegowda (2021) and Kwang Seok Ahn (2022), are expected to play increasingly important roles in future collaborations.

***Outliers and Less-Integrated Researchers*:**

Researchers like A.P. Gnana Prakash and N. Pushpa, who have fewer links and citations, may be newer to the field or focusing on niche areas yet to gain wider recognition. Their lower average citation scores (5.0 and 5.6) indicate peripheral roles in the current network, though their contributions could become more influential over time.

Overall, the visualization (Figure 3) reveals a complex landscape of collaboration, with certain key researchers acting as hubs that drive knowledge exchange while others operate in more specialized or emerging areas. While some researchers have fewer publications, their work still exerts significant influence in their respective fields.

Strengthening Collaborations: There is a strong correlation between collaboration and citation impact. Expanding collaborative networks can foster interdisciplinary insights and enhance research visibility. Targeting High-Impact Journals: Researchers with lower citation counts could increase their visibility by submitting work to higher-impact journals. Focusing on Emerging Areas: By aligning their research with emerging trends, researchers can enhance their individual profiles and contribute more broadly to the knowledge base in their fields.

The dataset indicates a promising landscape for academic collaboration and research quality. Nurturing these connections will be essential for enhancing the global impact and reach of research.

5.4. Country-Based Citation Network Visualization

The dataset, analyzed using VOSviewer overlay visualization (Figures 4a, 4b), provides insights into global research output and collaborations across 88 countries. This analysis offers essential observations regarding the research impact and relationships of various nations.

Overview of Data

Countries Represented: The dataset includes research output metrics for 88 countries, featuring parameters such as links, citations, and scores reflecting the academic impact of each nation. Metrics Explained: Countries are grouped based on similarities in research output and impact, facilitating comparative analysis. Weight Metrics: These include the number of links, total link strength, number of documents, citations, and normalized citations, providing a comprehensive view of academic output and collaborations. Scores: Metrics like average publication year, average citations, and normalized citations reveal the recency and relative impact of research from each country.

Key Observations

1. **Research Output and Impact**:
    - **India** leads in research output, with the highest number of documents (45,743) and 2,369 citations, demonstrating its prominent role in global academic research.
    - **The USA** also shows substantial research activity, with 6,054 citations from 249 documents, further solidifying its international academic influence.
2. **Geographical Distribution**:
    - **High-Output Countries**: Nations such as **Australia**, **Germany**, and **Canada** have robust research outputs, as seen in their high document and citation counts.
    - **Emerging Countries**: Countries like **Bangladesh**, **Vietnam**, and **Ghana** show growing research outputs, indicating a rising academic influence in global research.
3. **Average Publication Year**:
    - Most countries show an average publication year between 2016 and 2019, indicating recent contributions to research. However, countries like **Ecuador** and **Trinidad and Tobago** have older averages (2021 and 2008), suggesting a decline in recent academic contributions.
4. **Citations and Normalization**:
    - India and the USA show high normalized citation scores (1.10 and 1.35, respectively), while **Algeria** and **Benin** have lower values (0.52 and 0.65), highlighting variations in research recognition and impact.

- **Strengthening Research Ecosystems**: Countries with lower citation counts should improve research infrastructure and funding to enhance their academic impact.
- **Collaboration Opportunities**: Countries in similar clusters can leverage partnerships to enhance collective research output and visibility.
- **Focusing on Recent Research**: Nations with older average publication years should boost recent contributions by encouraging new research initiatives and increasing access to academic resources.

The VOSviewer overlay visualization (Figure 4) offers a detailed view of global research output and impact. While established nations dominate, emerging countries are gradually enhancing their academic profiles. Focused efforts in collaboration, funding, and infrastructure development will help these countries increase their research visibility and influence.

5.5. Keyword co-occurrence analysis

Figure 5. Largest set of connected authors' keywords with at least five occurrences.

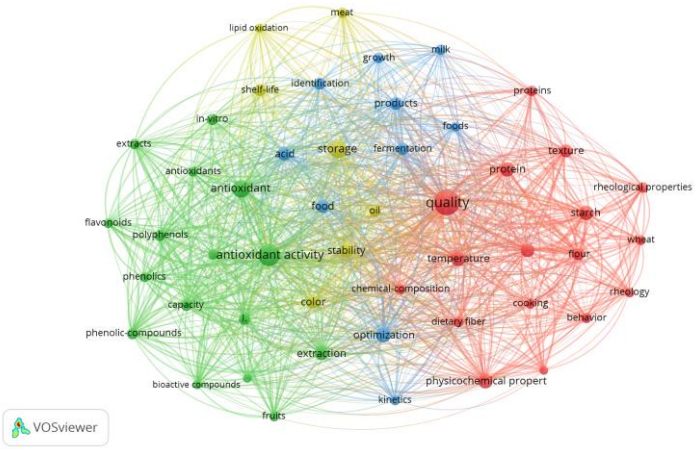

Figure 5 (a): VOSviewer network visualisation map.

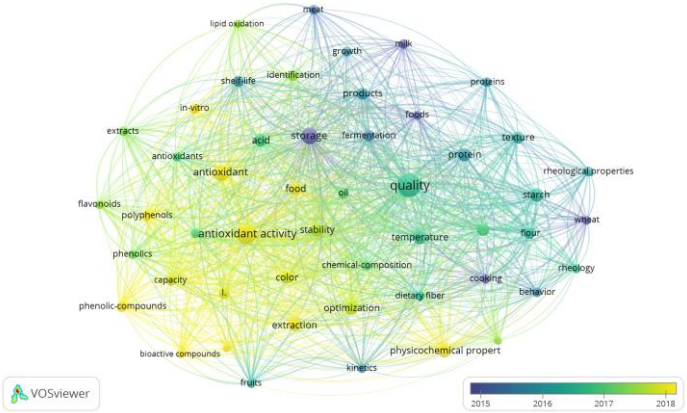

Figure 5 (b): VOSviewer overlay visualisation map.

5.6. Keyword Co-occurrence Analysis

The connections between keywords, thematic clusters, and trends in food science and health research are examined via the VOSviewer network visualisations (Figures 5a, 5b).

1. Keywords: Words like "behaviour," "cooking," and "protein," which highlight the physical characteristics of food and dietary practices. Includes terms like "antioxidant," "bioactive compounds," and "polyphenols," emphasising substances that are good for your health. "stability," "shelf-life," and "growth," all of which have to do with processing and food preservation. "colour," "lipid oxidation," and "storage," which highlight the visual appeal and quality of food.

2. Important Keywords: With 463 occurrences and total link strength of 1043, "Antioxidant activity" is the most common term, highlighting its significance in food science research. "Bioactive compounds" and "dietary fibre" are especially noteworthy, suggesting an emphasis on health advantages. With 1,166 occurrences, the word "quality" appears frequently, demonstrating the importance of food quality in study.

3. Publication Trends: The typical publication years for the majority of keywords range from 2015 to 2019, indicating how recent the research is. The average year of publishing for "dietary fibre" is 2016,51, whereas the average year of publication for "antioxidants" is closer to 2018.62.

4. Citation Metrics: The academic relevance of "Polyphenols" is demonstrated by its high average citation count of 33.82. Likewise, "phenolic compounds" and "bioactive compounds" exhibit high citation metrics.

A dynamic environment with an emphasis on food quality, processing methods, and substances that promote health is shown by keyword analysis in food science research. New fields like "optimisation" are becoming more well-known, suggesting potential avenues for further study. The information indicates the possibility of multidisciplinary cooperation in various domains and emphasises the growing significance of nutrition and health in current research.

The provided dataset contains information about keywords analyzed using VOSviewer, a software tool for visualizing bibliometric networks. This analysis will focus on the relationships among keywords, their thematic clusters, and the trends indicated by their metrics.

Conclusion:

The bibliometric examination of science and technology publications associated with the University of Mysore highlights its prominent role in global academia. The university's increasing research output, extensive international collaborations, and impactful publications demonstrate its growing reputation as a hub for scientific innovation. UoM's focus on areas like antioxidant activity, drug discovery, and chemical biology, coupled with its adoption of advanced technologies, has solidified its position in the global research landscape. The university's achievements ranging from high citation counts and patents to prestigious awards indicate a strong commitment to scientific advancement. With its consistent growth and emphasis on quality research, UoM is poised to further its influence in the global academic and scientific community.

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