International Journal of Research in Library Science

ISSN: 2455-104X

ISI Impact Factor: 3.723

Indexed in: IIJIF, ijindex, SJIF,ISI, COSMOS

Volume 2,Issue 2 (July-December) 2016,116-122

Received: 24 Aug .2016 ; **Accepted**: 31 Aug. 2016 ; **Published**: 5 Oct. 2016 ; **Paper ID**:IJRLS-1173

Scientometric Analysis of Black Pepper Research in India

SenthilKumaran P [1]; Abdul Jaseem [2]

Deputy Librarian [1]; Library Assistant [2]

Central University of Kerala, Tejaswini Hills, Periye, Post

Kasaragod, District, Kerala, State, India- 671316

senthilkumaran@cukerala.ac.in [1]; jaseem.chathambath@gmail.com[2]

ABSTRACT

A Scientometric study of Black Pepper literature published from 1999-2013 with respect to India using Horticultural Science Data base. Identifies the distribution of black pepper literature, forms of publication, core journals, prime authors and prime institutions was carried out for the benefit of various stakeholders at national and international level. The study revealed that India is a significant country dominating in the Research and Development activities of black pepper. India is leading producer and marketers and consumer of black pepper in the world. Hence, it is assumed that this region may be leading in the R& D activities on this product. The Activity Index trend reveals that though India produces more publications. Activity Index recorded an increasing trend during 1999 to 2004, 2007, 2008 and 2013. This paper also investigates the most prolific authors; primary institutions and key journals in black pepper are identified and critically examined for its features.

Keywords: Black Pepper, Spices, productivity pattern, R & D output and Scientometric Analysis

1. INTRODUCTION

Scientometric analysis of scientific publications is an important aspect of research endeavor information Science in recent years. It could be attributed to the fact that scientometric studies are used to identify the pattern of publications, authorship, citations, secondary journal coverage, and so on. These factors can give an insight into the dynamics of a subject, which consequently leads to better information handling and management. Scientometric analysis has received an adequate attention and it has been widely applied to evaluate the research performance of the scientists and the growth of various disciplines, Further it could be noted that scientometric data could be used in the identification of emerging research area, and in the evaluation of research performance of individual scientists, research groups and countries. It aims to integrate the cognitive or intellectual structure of research with a view to appraise the relations among the authors.

Black pepper is the dried mature but unripe berry (fruit) of *piper nigrum*, a branching vine or climbing, perennial shrub. Black pepper is one of the most important and earliest known spices in the world. It plays a significant role in Indian economy. Black pepper is the most important spices of India and world due to its day to day use. It is therefore rightly considered as the King of Spices. It is mainly cultivated in India, Indonesia, Vietnam, Malaysia, Brazil, Thailand, Sri Lanka and in some other

tropical countries. In many countries, where pepper is popular, the uses are mainly as a food ingredient and as a preservative. Besides, almost all the traditional systems of medicine – Ayurvedic, Homoeopathy, Unani and Aromatherapy as well as Chinese and African systems –regularly use pepper in various forms, both as a preventive and cure for an astonishing number of ailment with remarkable success. Pepper is an effective cure for malaria and also functions as a mosquito repellent. Pepper could help in relief of cold and cough reduce fever, function as an analgesic or anti-epileptic, help in digestion, serve as an antidote for food poisoning and relieve headache. The king of spices also has some cosmetic value and if applied as recommended it could help control baldness and hair loss. **(**Joshi, 1984) Analysed publications of the Central Plantation Crop Research Institute, India using publication lists from the annual reports of the institute and found that scientists at Central Plantation Crop Research Institute published mostly in 'crop journals' rather than subject journals. Most articles and papers were published on coconut and arecanut amongst the crops and crop protection amongst the subjects. (Arunachalam, 2000) mapped the life science research in India using *Biological Abstracts* for the period 1992-1994 using different scientometric indicators. (Senthilkumaran and Amudhavalli, 2004) have investigated the publication profile of Spices research in India using *HORT-CD and* identified the major spices, most prolific authors, primary institutions and key journals in Indian Spices research.

2. OBJECTIVES

This study attempts to

1. Quantify the world's output on Black pepper between 1999-2013
2. Quantify the Indian R & D output on Black pepper
3. Activity profile of India during the period of study
4. Identify the prime institutions and prolific authors and journals engaged in the literary output on Black Pepper.

3. METHODOLOGY

The source data for this study was Horticultural Science database, one of the world's leading English language abstracting and indexing services on this subject. This database was searched using the name of black pepper and *piper nigrum* as the key term for the chosen study period of fifteen years in all the fields of each record exccepting abstracts, Update Code and Accession number fields. The downloaded file was referred to as pepper txt. This file was further subdivided year wise. Using Fox Pro version 2.5 a working databases was created with the required fields only. Since the purpose of study was to ascertain Indian productive profile, the working database was searched by the each of the record of India.

4. RESULT AND DISCUSSION

4.1. Quantum of the World Records on Black Pepper

The world's publication output on black pepper needs to be analysed to identify those countries actively and regularly contributing to the subject. This attempt resulted in listing and ranking those countries producing literature on Black Pepper. The following table - 1 lists the quantum of literary output on black pepper.

Table – 1, Quantum of Literary output on Black pepper at Global level

S. No.	Country	TOTAL
1.	India	1163
2.	China	942
3.	USA	914
4.	Korea	663
5.	Brazil	661
6.	Spain	611
7.	Mexico	335
8.	Vietnam	330

9.	Turkey	324
10.	Japan	319
11.	Malaysia	308
12.	Indonesia	290
13.	Singapore	283
14.	Sri Lanka	280
15.	Italy	262
16.	Singapore	250
17.	Nigeria	216
18.	Germany	200
19.	Egypt	199
20.	Poland	179
21.	Netherlands	173
22.	Hungary	167
23.	Russia	160
24.	Iran	96
25.	Argentina	62
26.	Thailand	61
27.	Other countries	456
28.	Total	9904

This data clearly indicates that at the global level, India leads all through the fifteen years with 1163 records followed by China and USA ranks second and third positions respectively followed by Korea , Brazil, Spain, Mexico, Vietnam and Turkey.

4. 2. Quantum of Literary Output on Black Pepper Research – India

The ratio of Indian literary output against the world's literary output is presented in the following table - 2.

Table – 2 Activity Index of India on Black Pepper

S. No	Year	India's Contribution	World's Contribution	Activity Index Of India
01	1999	28	217	110
02	2000	62	446	118
03	2001	74	488	129
04	2002	79	489	138
05	2003	84	538	133
06	2004	92	671	117
07	2005	73	831	75
08	2006	108	1097	84

09	2007	97	748	110
10	2008	80	660	103
11	2009	68	696	83
12	2010	75	739	86
13	2011	82	794	88
14	2012	84	973	74
15	2013	72	455	135
Total		1163	9904	100 %

Table – 2 reveals that India is not only a major country in the world, but also found to be actively engaged and has expanded its R&D output over the years. There has been a fluctuation of its publication in Black Pepper Research.

4.3. Activity Index

Indian research effort and the relative performance have been assessed for the study period using the Activity Index (AI), as the absolute numbers are confounded by the size of the country, as well as the field. The formula suggested by (Frame, 1977) has been adopted for this purpose and it is as follows:

$$\frac{\{(\text{India output in a year}) / (\text{Total Indian output})}{\{(\text{World's output in that particular year}) / (\text{Total world's output})\}} \times 100$$

As per the formula, if the AI=100, then the country's research effort in the given field corresponds precisely to the world's average. If the AI is > 100 for a subject then that country publishes more papers in the field in relation to its total output than average for that Plantation crops field and vice versa. That is, AI < 100 indicates lower than average efforts dedicated to the field under study.

The Activity Index of India in relation to world output in the field of black pepper is given in Table No. 2. It is observed that during the year 1999 -2004, 2007, 2008 and 2013. AI is very high in 2002 and very lower in 2012. As per the table -2 quantitatively, India's total output constitutes 100 % of the world output. India's AI has risen to > 100 indicating that India publishes more papers in the field of black pepper in relation to its total output than average world output. However, it is to be noted that India's AI is fluctuating. During the years, 2005, 2006, 2009, 2010, 2011 and 2012 India's AI is lower than average efforts dedicated to the field under study. The pattern of AI in India is depicted in the fig. no.1

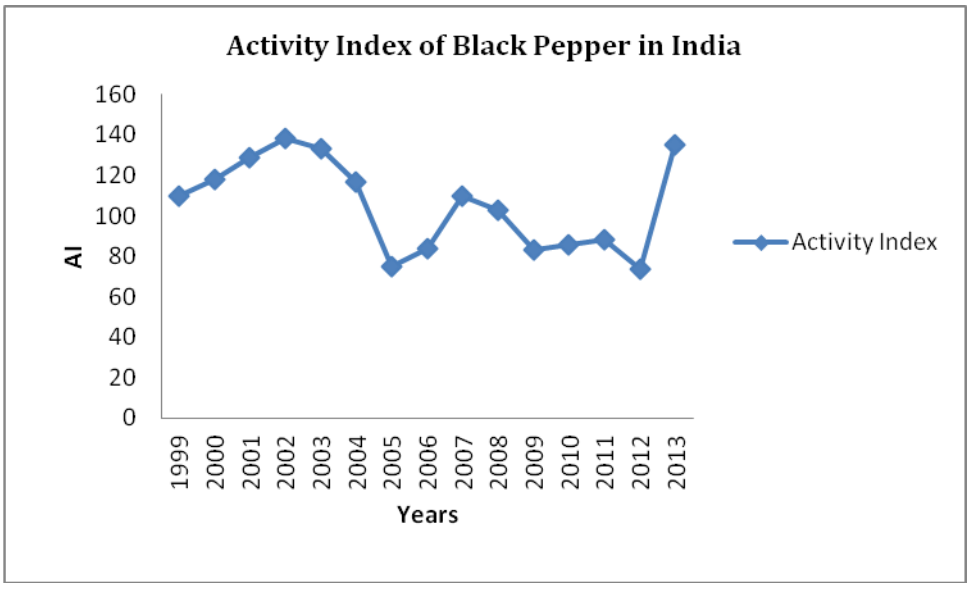

Fig. 1 Activity Index of Black Pepper in India

As per the formula, if the AI=100, then the country's research effort in the given field corresponds precisely to the world's average. If the AI is > 100 for a subject then that country publishes more papers in the field in relation to its total output than average for that black pepper field. That is, AI < 100 indicates lower than average efforts dedicated to the field under study.

4.4. Forms of Publications

Indian literary output on Black pepper has been analysed for its distribution pattern of physical forms of Publications. Table - 3 presents the varied forms, in which black pepper literature published. This includes Journal articles, Conference papers, chapters in Books, Thesis and Editorial etc, learned periodicals, even in the electronic age, continuous to be a very significant vehicle in the process of scientific communication. They help in building a collective knowledge base, act as a medium for communication of information helps in validating the quality of research enables distributing rewards and builds up scientific communities.

Table – 3 Forms of Publications on Black Pepper Research

S. No	Publication forms	Records	Percentage
01	Journal articles	772	66.03
02	Conference Paper	276	23.61
03	Book Chapter	73	6.24
04	Annual Report	28	2.40
05	Theses	07	0.60
06	Editorial	03	0.26
07	Miscellaneous	10	0.86
Total		1169	100

4.5. Key Journals on Black Pepper Research

The total journals are 772 and others are conference paper, book chapter, annual report, Theses, editorial and Miscellaneous. The journals are ranked based on their frequency of occurrence. Since the ranked list is too long, the top ten of the ranked list of journals titles is provided in the following table no. 4

Table – 4 Top Ten Journals

S. No	Journals	Publisher	Records
01	Journal of Spices and Aromatic Crops	Indian Institute of Spices Research, Calicut, Kerala	94
02	Indian Journal of Arecanut Spices and Medicinal Plants	Directorate of Cocoa and Development of Spices , Calicut	81
03	Indian Journal of Agricultural Sciences	Indian council of Agricultural Research, New Delhi	68
04	Indian Phytopathology	Indian Phytopathological Society , IARI, New Delhi	56
05	Journal of Plantation Crops	Central Plantation Crop research Institute, Kasaragod	51
06	Journal of Biological control	National Bureau of Agriculturally Important Insects, Bangalore	43

07	Journal of Medicinal and Aromatic Plant Sciences	Central Institute of Medicinal and Aromatic Plants, Lucknow	36
08	South Indian Horticulture	Tamil Nadu Agricultural University, Coimbatore	24
09	Indian Journal of Agronomy	Indian Society of Agronomy, IARI, New Delhi	22
10	Indian Perfumer	Essential Oil Association of India, New Delhi	19

An attempt was made to identify the significant Indian journals reporting on black pepper Research. The outcome of this analysis is presented in Table – 4. The Journal of Spices and Aromatic Crops published by IISR, Calicut, Kerala ranks highest with the contribution of 94 articles followed by Indian Journal of Arecanut Spices and Medicinal Plants with the contribution of 81 articles.

4.6. Prolific Authors on Black Pepper Research

Based on the frequency of occurrence of the first author's name only a ranked list of contributors was compiled. This process enabled to identify the top 10 authors in this field along with their affiliations (Table – 5)

Table – 5 Top Ten Indian Authors and their productivity pattern

S.No	Top Authors with their Affiliation	No of publications
01	Anandaraj, M, Indian Institute of Spices Research, Calicut, Kerala	35
02	Sarma, Y.R, Indian Institute of Spices Research, Calicut, Kerala	32
03	Bhat, A I, Indian Institute of Spices Research, Calicut, Kerala	30
04	Parthasarathy, V.A, Indian Institute of Spices Research, Calicut, Kerala	24
05	Kandiannan, K, Indian Institute of Spices Research, Calicut, Kerala	18
06	Sanjeet Kumar, Indian Institute of Vegetable Research, Varanasi	15
07	Thankamani, CK, Indian Institute of Spices Research, Calicut	14
08	Ramanujam, B, University of Agricultural Science , Bangalore	13
09	Balraj Singh, IARI, New Delhi	12
10	Ahmed, N, Sher e Kashmir University of Agricultural Science and Technology of Kashmir, Srinagar	11

The top ranked author is identified to be Anandaraj, M. affiliated to the Indian Institute of Spices Research, Calicut, Kerala with 35 publication to his credit. Interesting out of the top 10, six authors are from Kerala

4.7. Primary Institutions on Black Pepper Research

Author field includes personal and corporate authors, Analysis of this approach yielded to ascertain the primary institutions engaged in R & D on black pepper research. The rank list of these institutes was compiled based on their frequency of their occurrence in the author field. (Table -6).

Table – 6 Top Te n Indian Corporate authors

Rank	Prime Institutions	Records
01	Indian Institute of Spices Research , Calicut	58
02	University of Agricultural Science, Hebbal, Bangalore	51
03	Directorate of Cocoa Arecanut and Spices Development, Calicut	43
04	Indian Institute of Agricultural Research, New Delhi	30
05	Central Plantation Crops Research Institute, Kasaragod	26
06	Kerala Agricultural University, Thrissur	23
07	Indian Cardamom Research Institute, Spices Board, Cochin	21
08	Central Institute of Medicinal and Aromatic Plants, Luckow	18
09	Tamil Nadu Agricultural University, Coimbatore	17
10	Central Food Research Institute, Mysore	08

Since the list of corporate authors was long, the top 10 alone are presented here. It is clear that R & D units (7) are the major contributors to black pepper research. The other three includes University sectors.

5. CONCLUSIONS

India is found to be the predominant country as it tops in the rank list on black pepper research literature. The black pepper is high value commercial crops and plays a vital role in the Indian economy. AI is very high in 2002 and very lower in 2012. India's AI has risen to > 100 indicating that India publishes more papers in the field of black pepper in relation to its total output than average world output. However, it is to be noted that India's AI is fluctuating. During the years, 2005, 2006, 2009, 2010, 2011 and 2012 India's AI is lower than average efforts dedicated to the field under study. Indian Institute of Spices Research seems to be the prime producer of Black Pepper in India as it is tops the list of prolific authors, primary institutions and publisher of top journals on Black Pepper Research. It is inferred that India needs to review its performance in the black pepper research. Obviously, Black Pepper is the king of spices in the Oriental world. He is found to have a major role play with reference to spice industry, its products and literary output as well.

6. REFERENCES

[1]. S. Arunachalam, "National mapping of Science-India: Life Science", in Information Today and Tomorrow, vol.19. 2000, pp.20-26.

[2]. J.D. Frame, "Mainstream research in Latin America and the Caribbean", in Interciencia, vol.2. 1977, pp.143-148.

[3]. Y. Joshi, "Analysis of Publications of the Central Plantation Crops Research Institute", in IAALD Quarterly Bulletin, vol.24. 1984, pp.5-10.

[4]. I.N. Sengupta, "Bibliometrics, informetrics, scientometrics and librametrics: an overview", in Libri, vol.42. 1992, pp.75-98.

[5]. P. Senthilkumaran, and Amudhavalli, "Spices Research in India and Japan: a Scientometric Study", in Journal of Information Management and Scientometrics, vol.1. 2004, pp.42-45.

[6]. J. Singh, "Spices and Plantation Crops", India: Aaishkar Publishers, 2008, pp.1-23.

