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INDIAN JOURNAL OF CHEMISTRY (SECTION B): A SCIENTOMETRIC STUDY

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Abstract

The present paper examines the Indian Journal of Chemistry (Section B)'s contribution to the chemistry field during the period from 2014 to 2018. Indian Journal of Chemistry (Section B) is one of research publications of the National Institute of Science Communication and Information Resources (NISCAIR). The publications of the issues of the study journal are regular during the study period and the majority of the research papers are contributed by multiple authors. The contributors are belonged to thirty countries and major contributions are contributed by Indian authors.

Key Words: *Scientometric, Bibliometric, Chemistry, Indian Journal.*

Introduction

National Institute of Science Communication and Information Resources (NISCAIR) came into existence on 30 September 2002 with the merger of National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC). Both NISCOM and INSDOC, the two premier institutes of the Council of Scientific and Industrial Research (CSIR), were devoted to dissemination and documentation of science and technology information. NISCAIR has serving the society using modern IT infrastructure in a more effective manner and taking up new ventures in the field of science communication, dissemination and science and technology, information management systems and services. It has been publishing 18 research

journals in field of science and technology. All publications of the NISCAIR are freely available in its web site and mobile app. The Indian Journal of Chemistry is published monthly in two sections – A and B. The researcher has taken the publication particulars of the section B of Indian Journal of Chemistry for the present analysis. Impact factor of Indian Journal of Chemistry- Section B is 0.525 (JCR 2017).

Review of Literature

Many scientometric studies have been conducted by library and information professionals in the recent years. Some of the studies are reviewed for the purpose of conducting the present study. Two major studies reviews are presented as follows. Padme and Vaishali (2016) conducted a bibliometric analysis of 'Indian Journal of Chemistry-

Section A'. The Indian Journal of Chemistry-Section A published 482 research papers during the period of study i.e. from 2010 to 2014. The journal has published on an average of 96 research papers per year. The double authors contributed the maximum numbers of papers 119 (24.69%). The 653 contributors from 36 countries, India stands first place with the 66.76 percent of contributions and among Indian state wise distribution of the contributors, West Bengal stand first place with 71(16.28%) contributions. Simran Gupta and Nabi Hasan (2018) conducted a scientometric analysis of 200 research papers published in the journal, "Metamorphosis: a journal of management research" for the period from 2002 to 2016. The study found that most of the papers (57%) were published by single authors and remaining 43 percent papers were contributed by joint authors. Overall average Degree of Collaboration (DC), average Collaborative Index (CI) and average citation per paper were 0.43, 2.35 and 25.59 respectively. Remarkable collaborative contributors are from India with 81.65% sharing. The study also found that minimum AAPP as 1.08 with maximum productivity per author is 0.92 in the year 2002. On the other hand, maximum AAPP at 2.07 with minimum productivity per author at 0.48 in the year 2013.

Objectives of the study

The main objective of the study is to find out the publication trends in the popular journal "Indian Journal of Chemistry Section B". The other objectives are as follows:

- ❖ To examine the year wise distribution of research papers
- ❖ To find out the authorship pattern of research papers
- ❖ To find out the degree of collaboration among the authors in the field of the chemistry.
- ❖ To determine the country and Indian states and union territories wise distributions of research papers
- ❖ To examine the average length of the research papers
- ❖ To study the year wise distribution of references appended with the research papers.

Methodology

The present study adopted the scientometric techniques for evaluating the research publications of Indian Journal of

Chemistry (Section B). The study analyses in detail about the bibliographic attributes of the research papers and reference appended at the end of each papers in the study journal. The researcher collected the data from the journal's web site (<http://nopr.niscair.res.in>). Four hundred and seventy eight research papers from five volumes of the year from 2014 to 2018 have been taken for consideration of the present study. The information about the year wise distribution of research papers, single and multiple authors' contributions, and nativity pertains to authors and length of the research papers were collected. The collected data are organized, tabulated and calculated by using simple statistical methods with the help of MS – Excel. Apart from the general statistical analysis, some of the important bibliometric indicators like Degree of Collaboration, Relative Growth Rate and Doubling Time were calculated.

Analysis and Discussions

The collected information from the source journal is scrutinized systematically, tabulated properly, interpreted carefully and presented in the following paragraphs.

Year-wise Distribution of Research Papers

Year	No. of Issues	No. of Articles	%
2014	12	115	24.06
2015	12	106	22.18
2016	12	92	19.25
2017	12	75	15.69
2018	12	90	18.83
5 years	60	478	100

Mean value = 7.97 per issue and 95.60 per year

Table 1 indicates the number of research papers published in the Indian Journal of Chemistry Section B during 2014-2018. It is clear from the table 1 that the publications of the issues of the study journal are regular during the study period. It also shows that maximum 115 research papers and 106 research papers were published in 2014 and minimum 75 researches paper in 2017. The journal published on an average of 7.97 research papers per issue and 95.60 research papers per year during the study period.

Authorship Pattern

Table 2 shows the authorship pattern of research papers published in the Indian Journal of Chemistry (Section B) during the study

period. It indicates that ninety eight percent of the research papers have been written by more than two authors. The single author has

contributed 2.30 percent of the research papers during the study period.

Authorship Pattern

Authors	2014	2015	2016	2017	2018	Total	%
Single	2	1	1	2	5	11	2.30
Double	20	19	18	16	21	94	19.67
Three	35	28	17	16	25	121	25.31
Four	23	31	24	16	21	115	24.06
above Four	35	27	32	25	18	137	28.66
Total	115	106	92	75	90	478	100.00

Degree of Collaboration

The Degree of Collaboration in the field of chemistry is presented in the table 3. The Degree of Collaboration in the field of chemistry has been measured with help of the formula devised by K. Subramanian. The collaborative authorship is a well recognized feature of modern science. The study on "Authorship trend and collaborative research in Genetics and plant breeding" conducted by Mallinath Kumbar and N.G.Kumar (2011) found that intellectual sharing took place by two or more scientists. Multiple authors' research is very familiar in the present days. Out of the 478 research papers, multiple authors contributed 467 papers and on the other hand single author contributed 11 papers. The present study also proved the above statement. Degree of collaboration in the field of chemistry during the study period is 0.98.

Degree of Collaboration (DC)

Authors	Single	Multiple	DC
2014	2	113	0.98
2015	1	105	0.99
2016	1	91	0.99
2017	2	73	0.97
2018	5	85	0.94
Total	11	467	0.98

Productivity of the Author

Year	Articles	Authors	AAPP	PPA
2014	115	442	3.84	0.26
2015	106	395	3.73	0.27
2016	92	377	4.10	0.24
2017	75	290	3.87	0.26
2018	90	315	3.50	0.29
Total	478	1819	3.81	0.26

Yoshikane and others have introduced

the formulas to calculate the average author per paper (AAPP) and productivity per author (PPA). The formula was mathematically represented as follows:

Average author per paper = No. of authors / No. of papers

Productivity per author = No. of Papers/No. of authors

An average author per paper and productivity per author are calculated using the above mentioned formulas and the values are presented in the table 4. Table 4 depicts that the average number of authors per paper is 3.81 and the productivity per author is 0.26 during the study period.

Range of Citations per Research Paper

Table 5: Range of Citations Research Paper

Citations	20-14	20-15	20-16	20-17	20-18	Total	%
1-10	8	9	5	3	0	25	5.23
11-20	51	35	32	21	28	167	34.94
21-30	32	29	27	34	30	152	31.80
> 31	24	33	28	17	32	134	28.03
Total	115	106	92	75	90	478	100.00

Table 5 indicates the range and percentage of citations per research papers. Out of the 478 research papers, 453 (94.77%) research papers were appended with more than ten citations and 25 (5.23%) research papers with the citation range of 1-10.

Country Wise Distribution of Authors

The country wise distribution of the Authors is presented in the table 6. The results indicate that 1819 authors from 30 countries have been contributed 478 research papers

during the study period. Among the 1819 authors, 1473 (80.98%) authors are belonged to India and remaining 346 (19.22%) authors to other countries. Indian authors contributed major portions of the research papers in the selected journal during the study period;

followed by the authors from China 92 papers with 5.06%, Iran 38 papers with 2.09 %, Turkey 34 paper with 1.87% and the remaining countries authors contribution is less than one per cent.

Country Wise Distribution of the Contributors

S. No.	Name of the Country	No .of Authors	%	S. No.	Name of the Country	No .of Authors	%
1	India	1473	80.98	17	Europe	6	0.33
2	China	92	5.06	18	Canada	5	0.27
3	Iran	38	2.09	19	Italy	5	0.27
4	Turkey	34	1.87	20	Poland	5	0.27
5	Japan	18	0.99	21	Pakistan	4	0.22
6	Spain	16	0.88	22	USA	4	0.22
7	Azerbaijan	14	0.77	23	Jordan	4	0.22
8	Egypt	13	0.71	24	Mexico	3	0.16
9	Saudi Arabia	13	0.71	25	Bulgaria	3	0.16
10	Vietnam	12	0.66	26	Russia	2	0.11
11	Romania	12	0.66	27	Taiwan	2	0.11
12	South Africa	9	0.49	28	Macedonia	2	0.11
13	Algeria	7	0.38	29	South Korea	1	0.05
14	France	7	0.38	30	UK	1	0.05
15	Germany	7	0.38		Total	1819	100.00
16	Brazil	7	0.38				

Indian States and Union Territories Wise Distribution of Authors

Table 7 depicts shows the Indian states and union territories wise distribution of the authors. To analyses the research papers contributors in the Indian journal of chemistry (Section B) during the study period shows that 1473 authors are belonged to India's twenty six states and two union territories. More than

twenty per cent of the authors are belonged to Telangana (20.10%) and Maharashtra (20.03%). Five to nine per cent of the authors are belonged to Gujarat (8.96 %), Uttarpradesh (7.67%) and Tamilnadu (7.33%). Two to three per cent of the authors are belonged to Rajasthan (2.72%) and West Bengal (2.24%). The remaining states and union territories author's contribution is less than two per cent.

Indian States and Union Territories Wise Distribution of Contributors

S. No.	States / Union Territories	No .of Authors	%	S. No.	States / Union Territories	No .of Authors	%
1	Telangana	296	20.10	15	Madhya Pradesh	19	1.29
2	Maharashtra	295	20.03	16	Jammu and Kashmir	16	1.09
3	Gujarat	132	8.96	17	Kerala	15	1.02
4	Uttarpradesh	113	7.67	18	Uttarakhand	12	0.81
5	Tamil Nadu	108	7.33	19	Sikkim	11	0.75
6	Delhi	86	5.84	20	Haryana	8	0.54
7	Andhra Pradesh	85	5.77	21	Tripura	8	0.54

8	Karnataka	81	5.50	22	Himachal Pradesh	7	0.48
9	Rajasthan	40	2.72	23	Pondicherry	7	0.48
10	West Bengal	33	2.24	24	Goa	5	0.34
11	Odisha	26	1.77	25	Meghalaya	4	0.27
12	Manipur	22	1.49	26	Jharkhand	2	0.14
13	Assam	21	1.43	27	Arunachal Pradesh	1	0.07
14	Punjab	19	1.29	28	Bihar	1	0.07
					Total	1473	100.00

Year wise Distribution of References

No. of References	2014	2015	2016	2017	2018	Total	%
1-10	8	9	5	3	0	25	5.23
11-20	51	35	32	21	28	167	34.94
21-30	32	29	27	34	30	152	31.80
above 30	24	33	28	17	32	134	28.03
Total	115	106	92	75	90	478	100.00

Table 8 displays the year-wise distribution of references appended to the research papers published in the study journal during the period from 2014 to 2018. It indicates that the high percent (94.77%) of the research papers were appended with references in the range of 11 – 20 (34.94%), 21-30 (31.80 %) and above 30 references (28.03%) respectively. The remaining 5.23 per cent of research papers contains 1- 10 references.

Findings and Conclusions

The study journal, "Indian Journal of Chemistry (Section B) is one the important journals in the field of Chemistry. The total of 478 research papers were published in the journal during the period from January 2014 to December 2018 and maximum 115 research papers in the years 2014 and minimum 75 research paper in 2017. The majority of the papers (467) contributed by multiple authors and single author's contributed 11 papers only. Among the 1819 authors, 1473 (80.98%) authors are belonged to India and remaining 346 (19.22%) authors belonged to other countries. The majority of the research papers were appended with references in the range of 11 – 20 (34.94%), 21-30 (31.80 %) and above 30 references (28.03%) respectively.

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