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# BIBLIOMETRIC ANALYSIS OF INDIAN JOURNAL OF CHEMISTRY, SECTION B TO STUDY THE USAGE PATTERN OF INFORMATION IN THE FIELD OF MATERIAL SCIENCE

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# **BIBLIOMETRIC ANALYSIS OF INDIAN JOURNAL OF CHEMISTRY, SECTION B TO STUDY THE USAGE PATTERN OF INFORMATION IN THE FIELD OF MATERIAL SCIENCE**

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## **ABSTRACT**

The Present study deals with bibliometric analysis of articles and references provided at the end of each article contributed in *Indian Journal of Chemistry Section B*, Vol.52B , 2013. The study is carried out with a view to ascertain the types of documents most frequently used in the research process. The study indicates the authorship trend is towards team works rather than a work in isolation. It is observed that most of the publications cited are articles in journals; the number of references in other kinds of documents such as books/monographs, conference proceedings, theses/dissertation etc. are small. Among the citations from journal literature, majority are from foreign journals though the journals of Indian origin have also extensively used by the researchers. The most frequently cited journal titles were *Tetrahedron Letter*, *Journal of Medicinal Chemistry*, *Journal of Organic Chemistry*. The findings from this study could help in deciding titles of journals to be acquired, to continue or discontinue a subscription for a library.

## **1. Introduction**

Bibliometrics is a relatively new branch of information science and has now become a standard tool of science policy and research management in the last decades. Pritchard explained the term bibliometrics as “the application of mathematical and statistical methods to books and other media of communication” (Pritchard, 1969). Communication media comprises of books, papers in serials, periodicals, monographs, reports, thesis, e-books and e-journals. Regarding the scope of bibliometrics, O’Connor and Voos (1981) states that “its scope includes the study of the relationship among documents e.g. citation studies or describing a literature. Typically, these descriptions focus on

consistent patterns involving authors, monographs, journals or subject/language". The backbone of bibliometrics lies on some theoretical foundation, laid by some pioneers, such as, Lotka, Gross, Bradford, Zipf, Derek J de Solla Price, Bookstein, Mandelbrot, Brookes, Narin, Garfield, Vickery, Moravcsik, Cole brothers, Pritchard, Hulme and others. The purpose of this study is to analyze the characteristics of cited references in *Indian Journal of Chemistry, Section B (Organic Chemistry including Medicinal Chemistry)* which has been recognized as one of the most important journal of chemistry.

## **2. Need for the study**

Periodicals are essential resources for carrying out research and teaching. Faculty, Research Scholars and students depend heavily on these resources. But the costs of journals are more than books and number titles of journals are many and the collections also grow rapidly. Sometimes double in short period of time. So, in library proper policy should be adopted for journal collection. The bibliometric analysis will help in deciding titles of journals to be acquired, to continue or discontinue a subscription, to weed or not to weed a backset.

## **3. Source Journal**

*Indian Journal of Chemistry, section B* is a leading journal in Organic and Medicinal Chemistry started publishing from 1976. It publishes papers on organic reaction mechanism, theoretical organic chemistry, structure-activity relationships, medicinal chemistry, synthesis of chiral compounds, bio-organic chemistry, enzymes in organic synthesis, reagents in organic synthesis, heterocyclic compounds, phytochemistry (natural products), amino acids, peptides and proteins, spectroscopy in characterization of organic compounds, chemoenzymatic and enantioselective synthesis of organic compounds, synthesis of fullerenes, metalcatalyzed asymmetric reactions, bioactive plant products and combinatorial chemistry. It is the one and only authoritative journal in chemistry, published in India.

## **4. Review of literature**

A number of bibliometric studies have been carried out during the last three decades to study the form and structure of scientific communication,

growth and scattering of literature, authorship pattern, collaboration in research, obsolescence of literature and to identify core journals and research trends of science disciplines.

Pattern of information use by Indian entomologists was studied and found that major portion of the citations are from journals (73.9%) and a total of 41.7% citations are from Indian sources followed by 23.1% from USA (Barooah 1993).

Bibliometric analysis of science journals published from India was studied and found that Chemistry had the highest percentage of joint authored references and contributions from abroad were increasing in physics, chemistry, geology and medical sciences (Jalaja 1997).

Citation pattern of Indian Journal of Chemistry was studied and found that two authored and three authored citations are predominant and comprise 55.5% of total citations. It is also found that importance of journals in this field which accounts for 85% of total citations and almost all of them pertain to foreign journals indicating that Indian journals are hardly consulted by researchers which is 1.76% (Dutta and Sen 2001).

Authorship pattern and global research productivity in heart diseases was studied and found that nearly 34.95% of the contributions were by more than five authors. The contribution of single author is 14.65% (Thirumagal, Devi, and Sethukumari 2012).

Citation frequency of Doctoral theses in Zoology was studied and found that research is, now a day a team work rather than a work in isolation. It is found from his analysis that USA is the leading country with 24.49% of the total journals cited, U.K. has a contribution with 17.52% of journals and India with 14.55% (Rahman 2013).

## **5. Objective of the Study**

The specific objectives of this study are:

1. To make an analysis of articles published in Indian Journal of Chemistry, section B.

2. To find out the number of cited documents and the average number of references per article.
3. To study the authorship pattern.
4. To identify geographical distribution of journals cited.
5. To identify the number and forms of document cited.
6. To study the age of cited journals.
7. To prepare the rank list of cited journals.

## **6. Methodology**

Methodology applied in the present study is bibliometric analysis which is used to study in detail the bibliographic features of the articles and citation analysis of the reference appended at the end of each article, published in *Indian Journal of Chemistry, Section B*, Vol.52B, 2013. The data collected from *Indian Journal of Chemistry, Section B* made from all 12 issues of Vol.52B, 2013. Information on each cited document such as title, types of document, country of origin, year, No. of authors, No. of Citations in each month/issue etc. are recorded and analyzed for making observation. For subsequent analysis and interpretation collected data were fed to MS-Excell. The tables were generated in accordance with the objective of the study. The Ulrich's Periodical Directory and OCLC WorldCat were used to retrieve the bibliographic detail (country origin, type of document, year etc.) of cited documents of the source journal

## **7. Scope**

The present study attempts on the pattern of information uses by researchers in the field of material science. Under the study a focus has been given at deriving quantitative analysis based on citations collected from the end of each article of *Indian Journal of Chemistry, Section B* of all 12 issues of volume 52b, 2013.

## **8. Data Analysis**

Data analysis is the main part of any writings which are based on any study containing data/information/fact. With the help of the data analysis any research activities/articles may cite the state-of-the-art of the concerned area/topic and come to conclusion followed by the findings and suggestions. The data analysis is representing on the basis of the sequence of the objectives.

### 8.1 Month/issue-wise Distribution of citations

Table 1 shows the month-wise and issue-wise distribution of citations.

**Table 1:Month /issue-wise Distribution of Citations**

Month	No. of Citations	Cumulative No. of Citations	Percentage	Cumulative Percentage
January	315	315	10.30	10.30
February	258	573	8.44	18.74
March	331	904	10.82	29.56
April	299	1203	9.78	39.34
May	203	1406	6.64	45.98
June	265	1671	8.67	54.64
July	302	1973	9.88	64.52
August	237	2210	7.75	72.27
September	244	2454	7.98	80.25
October	243	2697	7.95	88.19
November	197	2894	6.44	94.64
December	164	3058	5.36	100.00
<b>Total</b>	<b>3058</b>	<b>3058</b>	<b>100.00</b>	<b>100.00</b>

### 8.2 Authorship Pattern of Citations

Table 2 shows the details of the authorship patterns during the period under study.

**Table 2: Authorship Pattern of Citations**

Sl. No	No. of Authors	Total Citation	Cumulative Citation	Percentage	Cumulative Percentage
1	One Author	338	338	11.05	11.05
2	Two Author	704	1042	23.02	34.07
3	Three Author	679	1721	22.20	56.28
4	Four Author	523	2244	17.10	73.38
5	Five Authors	315	2559	10.30	83.68

6	More Than Five Authors	464	3023	15.17	98.86
7	Anonymous	35	3058	1.14	100.00
<b>Total</b>		<b>3058</b>	<b>3058</b>	<b>100.00</b>	<b>100.00</b>

It is clear from Table 2 that two authored papers comprised the highest percentage (23.02) of total 3058 citations. The contribution of one author is 11.05%, Three authors 22.20%, Four authors 17.10%, Five authors 10.30% and more than 5 authors are 15.17%. Thus, multi-authored papers far outnumbered single –authored papers, accounting for 87.79% of the total cited papers. It is observed that there are about 1.14% citations from papers which were published in the banner of their institutions and not in personal authorship. Since this is a very small portion it can be neglected also.

### 8.3 Geographical Distribution of Citations:

From the citations the country of their origin can be identified in all types of materials like journal articles, books, reports etc. Table 3 presents the geographical distribution of citations.

**Table 3:**

Sl. No	Name of Country	No. of Citations	Cumulative Citations	Percentage	Cumulative Percentage
1	India	178	178	5.82	5.82
2	Foreign	2880	3058	94.18	100.00
<b>Total</b>		<b>3058</b>	<b>3058</b>	<b>100.00</b>	<b>100.00</b>

Table 3 shows that most of the contributions are from foreign sources.

### 8.4 Sources of Documents

Authors usually cite different kinds of documents keeping in view the nature of the research problems under investigation. Table 4 gives the details of the types of documents cited along with the number of citations.

**Table 4: Sources of Documents**

Sl. No	Source of Documents	No. of Citations	Cumulative Citations	Percentage	Cumulative Percentage
1	Journals	2794	2794	91.37	91.37
2	Books/Monographs	186	2980	6.08	97.45
3	Theses/Dissertation	4	2984	0.13	97.54
4	Conference Proceedings	2	2986	0.07	97.65
5	Others	72	3058	2.35	100.00
<b>Total</b>		<b>3058</b>	<b>3058</b>	<b>100.00</b>	<b>100.00</b>

literature comprised the highest citations 2794 (91.37%) of the total 3058 citations. The citations from books occupy second highest position i.e. 186 (6.08%) followed by Theses/dissertation 4(0.13%), Conference Proceedings 2(0.07%) and others 72(2.35%). This indicates that journals are the most preferred channels of information among research scholars in the field of material science.

### 8.5 Year wise Distribution of Citations:

Year wise distribution of citations helps to test the recentness in citation. The table 5 represents the year wise distribution of citation.

**Table 5: Year wise Distribution of Citations**

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Sl. No.	Year	Citations	Cumulative Citations	Percentage	Cumulative Percentage
1	Before 50	51	51	1.67	1.67
2	1950-59	35	86	1.14	2.81

Sl. No	Rank	Journal	No. of Citation	Cumulative Citation	Percentage	Cumulative Percentage
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3	1960-96	87	173	2.84	5.66
4	1970-79	189	362	6.18	11.84
5	1980-89	273	635	8.93	20.77
6	1990-99	617	1252	20.18	40.94
7	2000-09	1538	2790	50.29	91.24
8	2010 onwards	268	3058	8.76	100.00
<b>Total</b>		<b>3058</b>	<b>3058</b>	<b>100.00</b>	<b>100.00</b>

Table 5 depicts the year wise (decade) distribution of citations. The analysis reveals that maximum citations fall in the decade 2000-09 (50.29%).

#### **Table 6:**

#### **8.6 Ranking list of Journals in Material Science:**

The ranked list is a practical tool designed to help the librarians and researchers to select the journals of maximum utility in terms of their coverage in particular subjects. The journals are arranged according to the descending order of citations received by individual journals. The journal with the highest number of citations will occupy the highest rank to the number of citations in descending order.

The ranked list of journals in material science is presented in Table 6.

#### **Table 6: Ranking list of Journals in Material Science**

1	1	Tetrahedron Lett	237	237	8.48	8.48
2	2	J Med Chem	142	379	5.08	13.56
3	3	J Org Chem	138	517	4.94	18.50
4	4	Tetrahedron	119	636	4.26	22.76
5	4	Indian J Chem, Section B	119	755	4.26	27.02
6	5	J Am Chem Soc	99	854	3.54	30.57
7	6	Eur J Med Chem	84	938	3.01	33.57
8	7	Synth Commun	69	1007	2.47	36.04
9	8	Bioorg Med Chem Lett	65	1072	2.33	38.37
10	9	Org Lett	60	1132	2.15	40.52
11	10	Bioorg Med Chem	52	1184	1.86	42.38
12	11	Chem Rev	48	1232	1.72	44.09
13	12	Synlett	46	1278	1.65	45.74
14	13	Synthesis	44	1322	1.57	47.32
15	14	Tetrahedron: Asymmetry	43	1365	1.54	48.85
16	15	J Heterocycl Chem	40	1405	1.43	50.29
17	16	Chem Commun	33	1438	1.18	51.47
18	17	Green Chem	27	1465	0.97	52.43
19	18	ARKIVOC	24	1489	0.86	53.29
20	19	Chem Pharm Bull	23	1512	0.82	54.12
21	20	J Nat Prod	21	1533	0.75	54.87
22	21	Angew Chem Int Ed	20	1553	0.72	55.58
23	21	Heterocycles	20	1573	0.72	56.30
24	21	II Farmaco	20	1593	0.72	57.02
25	21	J Chem Res	20	1613	0.72	57.73
26	22	Angew Chem Int Ed (Engl)	18	1631	0.64	58.38
27	23	Phytochemistry	17	1648	0.61	58.98
28	24	Chem Eur J	16	1664	0.57	59.56
29	24	Chem Lett	16	1680	0.57	60.13
30	24	J Chem Soc	16	1696	0.57	60.70
31	25	Catal Commun	15	1711	0.54	61.24
32	25	Indian J Heterocycl Chem	15	1726	0.54	61.78
33	26	Antimicrob Agents Chemother	14	1740	0.50	62.28
34	26	Can J Chem	14	1754	0.50	62.78
35	26	J Chem Soc Chem Commun	14	1768	0.50	63.28
36	26	J Chem Soc Perkin Trans 1	14	1782	0.50	63.78
37	26	Org Biomol Chem	14	1796	0.50	64.28
38	27	Chem Ber	12	1808	0.43	64.71
39	27	J Indian Chem Soc	12	1820	0.43	65.14
40	27	J Mol Catalysis A: Chemical	12	1832	0.43	65.57
41	27	Nature	12	1844	0.43	66.00
42	28	Adv Synth Catal	11	1855	0.39	66.39
43	28	Chem Soc Rev	11	1866	0.39	66.79
44	28	J Bio Chem	11	1877	0.39	67.18
45	28	J Pharm Sci	11	1888	0.39	67.57

46	29	Chem Heterocycl Compd	10	1898	0.36	67.93
47	29	Molecules	10	1908	0.36	68.29
48	29	Phosphorus Sulfur Silicon Relat Elem	10	1918	0.36	68.65
49	30	Aust J Chem	9	1927	0.32	68.97
50	30	Green Chem Lett Rev	9	1936	0.32	69.29
51	30	Helv Chim Acta	9	1945	0.32	69.61
52	30	J Antimicrob Chem	9	1954	0.32	69.94
53	30	J Chromatogr	9	1963	0.32	70.26
54	32	Acc Chem Res	8	1971	0.29	70.54
55	32	J Agri Food Chem	8	1979	0.29	70.83
56	32	Monatsch Chem	8	1987	0.29	71.12
57	33	Arch Pharm	7	1994	0.25	71.37
58	33	Eur J Org Chem	7	2001	0.25	71.62
59	33	Orient J Chem	7	2008	0.25	71.87
60	34	Appl Catal A: Gen	6	2014	0.21	72.08
61	34	Bull Chem Soc Jpn	6	2020	0.21	72.30
62	34	Cancer Res	6	2026	0.21	72.51
63	34	Chem Abstr	6	2032	0.21	72.73
64	34	Curr Med Chem	6	2038	0.21	72.94
65	34	J Ethnopharmacol	6	2044	0.21	73.16
66	34	Med Chem Res	6	2050	0.21	73.37
67	34	Org React	6	2056	0.21	73.59
68	34	Org Synth	6	2062	0.21	73.80
69	34	Pure Appl Chem	6	2068	0.21	74.02
70	35	Biochem Pharmacol	5	2073	0.18	74.19
71	35	Heteroatom Chem	5	2078	0.18	74.37
72	35	Inorg Chim Acta	5	2083	0.18	74.55
73	35	J Chinese Chem Soc	5	2088	0.18	74.73
74	35	J Fluorine Chem	5	2093	0.18	74.91
75	35	Lett Org Chem	5	2098	0.18	75.09
76	35	Med Res Rev	5	2103	0.18	75.27
77	35	Nat Prod Rep	5	2108	0.18	75.45
78	35	Organometallics	5	2113	0.18	75.63
79	35	Pharm Res	5	2118	0.18	75.81
80	35	Pharmazie	5	2123	0.18	75.98
81	35	Russ Chem Rev	5	2128	0.18	76.16
82	35	Steroids	5	2133	0.18	76.34
83	36	Indian J Pharm Sci	4	2137	0.14	76.49
84	36	Chin Chem Lett	4	2141	0.14	76.63
85	36	Acta Cryst E	4	2145	0.14	76.77
86	36	Adv Heterocycl Chem	4	2149	0.14	76.91
87	36	Anal Chim Acta	4	2153	0.14	77.06
88	36	Arch Pharm(Weinheim)	4	2157	0.14	77.20
89	36	Bull Korean Chem Soc	4	2161	0.14	77.34
90	36	Carbohydr Res	4	2165	0.14	77.49
91	36	Collect Czech Chem Commun	4	2169	0.14	77.63
92	36	E J Chem	4	2173	0.14	77.77
93	36	Eur J Phamacol	4	2177	0.14	77.92

94	36	Inorg Chem	4	2181	0.14	78.06
95	36	Int J Chem Tech Res	4	2185	0.14	78.20
96	36	J Antibiot	4	2189	0.14	78.35
97	36	J AOAC Int	4	2193	0.14	78.49
98	36	J Chem Soc Perkin Trans	4	2197	0.14	78.63
99	36	J Saudi Chem Soc	4	2201	0.14	78.78
100	36	J Serb Chem Soc	4	2205	0.14	78.92
101	36	Mol Divers	4	2209	0.14	79.06
102	36	Organic Lett	4	2213	0.14	79.21
103	36	Pharm Chem J	4	2217	0.14	79.35
104	36	Proc Soc Exptl Biol Med	4	2221	0.14	79.49
105	37	Analyst	3	2224	0.11	79.60
106	37	Antibiot	3	2227	0.11	79.71
107	37	Arch Pharm Chem Life Sci	3	2230	0.11	79.81
108	37	Asian J Chem	3	2233	0.11	79.92
109	37	Biochemistry	3	2236	0.11	80.03
110	37	Bioog Med Chem Lett	3	2239	0.11	80.14
111	37	Cancer Lett	3	2242	0.11	80.24
112	37	Chem Biol	3	2245	0.11	80.35
113	37	Curr Drug Targ	3	2248	0.11	80.46
114	37	Curr Sci	3	2251	0.11	80.57
115	37	Drugs	3	2254	0.11	80.67
116	37	Drugs Future	3	2257	0.11	80.78
117	37	Experientia	3	2260	0.11	80.89
118	37	Heterocycl Commun	3	2263	0.11	80.99
119	37	J Clin Oncol	3	2266	0.11	81.10
120	37	J Coord Chem	3	2269	0.11	81.21
121	37	J Natal Cancer Inst	3	2272	0.11	81.32
122	37	J Organomet Chem	3	2275	0.11	81.42
123	37	J Sci Ind Res	3	2278	0.11	81.53
124	37	Liebigs Ann Chem	3	2281	0.11	81.64
125	37	Med Chem	3	2284	0.11	81.75
126	37	Mol Pharmacol	3	2287	0.11	81.85
127	37	Org Process Res Dev	3	2290	0.11	81.96
128	37	Planta Medica	3	2293	0.11	82.07
129	37	Polyhedron	3	2296	0.11	82.18
130	37	QSAR Comb Sci	3	2299	0.11	82.28
131	37	SAR QSAR Environ Res	3	2302	0.11	82.39
132	37	Science	3	2305	0.11	82.50
133	37	Sulfur Letters	3	2308	0.11	82.61
134	37	Synth React Inorg, Metal- org Nano-metal Chem	3	2311	0.11	82.71
135	38	75 journals having 2 citations each	150	2461	5.37	88.08
136	39	333 journals having 1 citation each	333	2794	11.92	100.00
<b>Total</b>			<b>2794</b>	<b>2794</b>	<b>100.00</b>	<b>100.00</b>

From table 6, it is observed that 16 journals occupy 50.29% of the total citations.

Among them the first three most frequently cited journals are *Tetrahedron Lett* 237 (8.48%), *J Med Chem* 142 (5.08%) and *J Org Chem* 138(4.94%) Out of first 16 ranked journals, only one journal is from India i.e. the source journal *Indian Journal of Chemistry, Section B*. It covers 119 (4.26%) citations.

### **Bradford's Law:**

The Bradford's law derived its universality in application from the basic use in scientific field. If a bibliography is to be compiled on any subject, it is marked that there is always a small group of core journals that account for a substantial percentage (1/3) of the articles on that subject or discipline. Then there is a second larger group of journals that account for another third while a much larger group of journals pick up the last third (Garfield, 1980).

Present study reveals 8 journals covered 1007 citations, next 56 journals covered 1031 citations and next 478 journals covered 1020 citations. In other words first 8 journals covers 1/3 of the total citations, the next 56 journals accounted for other 1/3 citations and the next 478 journals covered remaining 1/3 citations.

Thus the 1<sup>st</sup> zone of nucleus contains 8 journals followed by the 2<sup>nd</sup> zone containing 56 journals and 3<sup>rd</sup> zone having 478 journals.

The zones thus identified will form an approximate series in the form

$$8:56:478$$

$$\text{Here } 56 = 8*8$$

$$478 = 8*8^2$$

$$\text{i.e. } 8:8*8:8*8*8$$

$$\text{Substituting } 8 = n$$

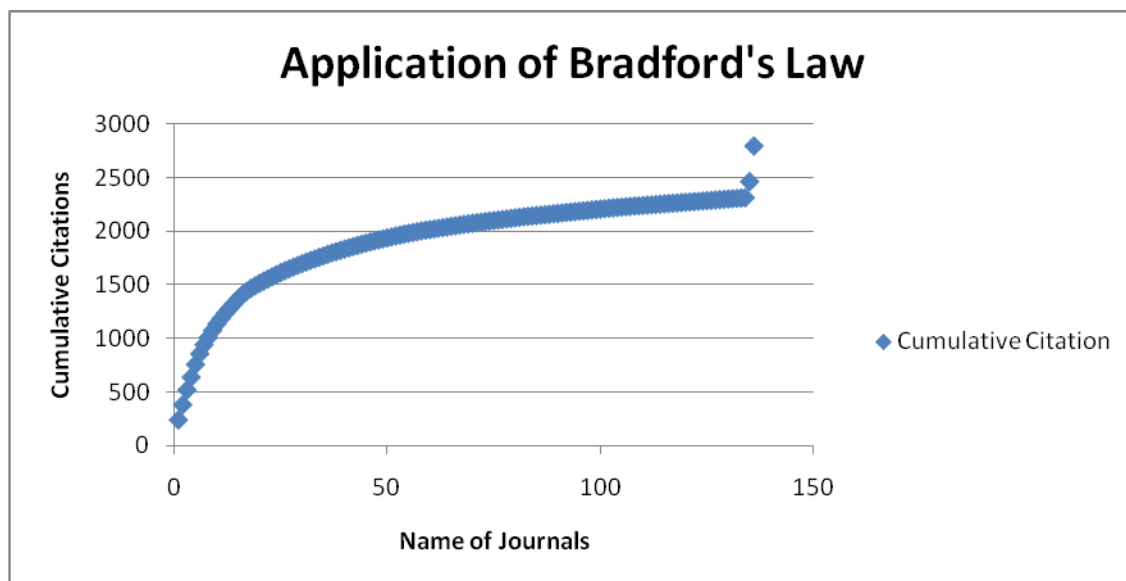
$$\text{Hence } 8:8n:8n^2$$

Where 1<sup>st</sup> 8 represents no. of journals in the nucleus and the 2<sup>nd</sup>

8 represents  $n = n$  multiplier

The Bradford's Law of Scattering is tested.

**Figure 7: Application of Bradford's Law**



### 8.7 Indian Contribution

Table 7 shows Indian origin of various sources of cited documents.

**Table 7: Indian Contribution**

Sl. No	Source of Documents	Citations	Cumulative Citations	Percentage	Cumulative Percentage
1	Journals	164	164	92.13	92.13
2	Books/Monographs	13	177	7.30	99.44
3	Theses/Dissertation	0	177	0	99.44
4	Conference Proceedings	0	177	0	99.44
5	Others	1	178	0.56	100.00
<b>Total</b>		<b>178</b>	<b>178</b>	<b>100.00</b>	<b>100.00</b>

Out of 178 citations, the highest no. of citations is from Journals 164 (92.13%) followed by books/monographs 13(7.30%)

### 8.8 Ranking of Indian Journals

A Rank list of cited Indian Journals was prepared and is given in table 8.

**Table 8: Ranking of Indian Journals**

Sl. No.	Rank	Journal	Citations	Cumulative Citations	Percentage	Cumulative Percentage
1	1	Indian J Chem, Section B	119	119	72.56	72.56
2	2	Indian J Heterocycl Chem	15	134	9.15	81.71
3	3	J Indian Chem Soc	12	146	7.32	89.02
4	4	Indian J Pharm Sci	5	151	3.05	92.07
5	5	Indian J Chem Technol	2	153	1.22	93.29
6	5	Indian Phytopathology	2	155	1.22	94.51
7	5	Rasayan J Chem	2	157	1.22	95.73
8	6	7 Journals having 1 citation	7	164	4.27	100.00
Total			164	164	100.00	100.00

It is found from the table 8 that there are 8 Indian journals in the list. The journals are arranged according to the citations they received. Table 9 shows that *Indian Journal of Chemistry, Section B* with 119 citations (72.56%) ranks the top.

## 9 Findings and Conclusion

The present study is an approach to the analysis of usage pattern of information used by the researchers in the field of material science. In this study 3058 citations collected from the end of each article of *Indian Journal of Chemistry, Section B* of all 12 issues of volume 52b, 2013.

According to the distribution by document type most of the publications cited are articles in journals.

The high percentage of citations of journal articles confirms the important role played by scientific journals in the process of Scientific Communication. The paucity of citations of other types of documents such as monographs, these and reference tools like encyclopedias, subject dictionaries etc. may be both due to the difficulty in accessing such literature and to the fact as these sources are least concerned in science research.

The preference of learned foreign journals as the major medium of science communication is a well established fact. Most probably the lack of indigenous literature on local problems may be the reason that prompts the scholars to depend more on foreign sources. But the present study revealed that the papers from journals of Indian origin have greatly been used by the scholars. The view is also confirmed by earlier workers (Barooah et al 1999, Thanuskodi 2011)

The ranked list of journals prepared from the journals citations in *Indian Journals of Chemistry, Section B*, Vol.52B, 2013. Out of 2794 cited *Journal Tetrahedron Lett* 237 (8.48%) ranked first. Followed by *J Med Chem* 142 (5.08%) ranked Second and *J Org Chem* 138(4.94%) is on ranked Third.

The year wise distribution of the cited documents reveals that publications of pre 1950s are still continue to be cited in the source journal. The year-wise distribution of journals indicated that journals published from 2000 – 09 are highly preferred and its percentage is 50.29. In the field of chemistry as a whole it was also established that researchers mostly cites earlier works of 10-20 years<sup>(Barooah et al 1999)</sup>.

Authorship is an important facet of scientific research. A detailed analysis of the authorship of citations reveals that research is now a day a team works rather than a work in isolation. Therefore in a large majority of scientific publications in material science find more than one name in the author statement.

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