

## CITATION ANALYSIS: INDIAN JOURNAL OF CHEMISTRY VOLUME: B

Magre Ujwala Yadavrao\* Dr.Vivek S.Sathe\*\*

**\* Asst. Librarian**

Shri. Muktanand College  
Gangapur, Maharashtra,  
India.

**\*\*Librarian**

Chetna Shikshan Prasarak  
Mandal's Arts Senior  
College,  
Aurangabad, Maharashtra,  
India.

QR Code



**Abstract:** - *The present paper focuses 18065 citations of Indian Journal of Chemistry (Volume-B). It discusses on form-wise distribution of citations, distribution of e-citations and p-citation, chronological distribution of citations, authorship pattern of citations, ranking of authors, ranking of publishers, geographical distribution of citations, Indian and foreign distribution of citations, language-wise distribution of citations, ranking of journals and ranking of books.*

**Keywords :** Citation, Citation analysis, Indian Journal of Chemistry

### INTRODUCTION

Citation analysis is one of the methodologies adopted by libraries for evaluating their collection as well as a tool for building an effective journal collection. Citation analysis is useful for librarians, teachers, researchers and information scientists to represent the relationship which exist between the cited and citing document, the technique of citation analysis involve the process of collection, counting and analysis given in various types of literature. Therefore citation

analysis is important study for any discipline of pure sciences and social sciences.

### SURVEY OF LITERATURE

Citation analysis is an effective but somewhat neglected technique of collection development and Evaluation. The method of Citation analysis consists of counting and ranking the number of times documents are cited in bibliographies footnotes, and/or indexing tool (Baker and Lancaster, 1991), citation analysis permits the researcher to comprehend current developments in subject fields, the properties of bibliographical

usage, and research trends (Chen,2004), Citation analysis has many critics, and some have focused their criticism on the idea that citation analysis could be used as an input into the RAE -Research Assessment Exercise process (Norris and Oppenheim, 2003), citation analysis can be used to study the nature and characteristics of literature cited in the different discipline (Balasubramanian and Bhaskar, 1984).The review of literature shows the usefulness of citation analysis study to the librarians and researchers in the various disciplines. Citations analysis and citation impact analysis to satisfy ‘useful purposes’ in supporting the interests of the research environment (Wormell, 1998),

**OBJECTIVES OF THE STUDY:-**

1. To find out the Volume wise distribution of citations.
2. To find out form wise distribution of cited documents
3. To find out the distribution of E-citations and P-citations
4. To find out the chronological distribution of cited documents
5. To find out the authorship pattern of cited documents
6. To rank the cited author
7. To rank the cited publisher
8. To find out the county of origin of the cited documents
9. To find out Indian and Foreign distribution of cited documents

10. To find out the language wise distribution of cited documents

11. To rank the cited journals

**DATA ANALYSIS:-**

**VOLUME-WISE DISTRIBUTION OF CITATIONS PER ARTICLE.**

The volume wise distribution of citations per article of “Indian Journal of Chemistry (volume - B)” of 10 volumes was considered for the present study from the year 2005-2014. The span of 10 years was taken into consideration which is shown in the table No. 1.

**Table No.1 Volume-Wise Distribution of Citations per Articles.**

Sr. No	Vol. No	Year	Number of Articles	Number of Citations	Average Citation Per Article
1	44 B	2005	140	2417	13.38
2	45 B	2006	142	2811	15.56
3	46 B	2007	106	1896	10.50
4	47 B	2008	74	1579	8.74
5	48 B	2009	84	1776	9.83
6	49 B	2010	52	1028	5.69
7	50 B	2011	56	1214	6.72
8	51 B	2012	57	1326	7.34
9	52 B	2013	60	1523	8.43
10	53 B	2014	105	2495	13.81
<b>Total</b>	<b>10</b>	<b>10</b>	<b>876</b>	<b>18065</b>	<b>100.00</b>

Table No. 1 Shows that the total number of articles published during 2005 to 2014, Were 876 and the total number of citations were 18065.

Year wise analysis of citations shows that average

number of per article is maximum (15.56) in the year 2006 and it also seen minimum (5.69) in the year 2010.

### FORM WISE DISTRIBUTIONS OF CITATIONS

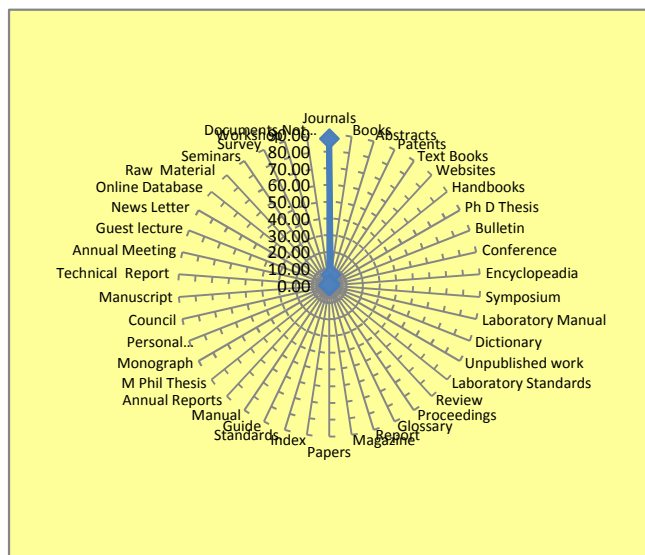
The form wise distribution of different forms of literature is used by researcher in Indian Journal of Chemistry Volume-B. A total number of 18065 citations of 120 issues in 10 volumes are distributed in different sources as per shown in table No.2 and figure No.1

**Table No. 2 Form Wise Distributions of Citations**

Sr.No	Documents	Citations	Rank	Percentage
1	Journals	15794	1	87.43
2	Books	1165	2	6.45
3	Abstracts	229	3	1.27
4	Patents	219	4	1.21
5	Text Books	67	5	0.37
6	Websites	45	6	0.25
7	Handbooks	40	7	0.22
8	Ph D Thesis	32	8	0.18
9	Bulletin	30	9	0.17
10	Conference	28	10	0.15
11	Encyclopedia	25	11	0.14
12	Symposium	24	12	0.13
13	Laboratory Manual	24	12	0.13
14	Dictionary	22	13	0.12
15	Unpublished work	19	14	0.11

16	Laboratory Standards	18	15	0.10
17	Review	18	15	0.10
18	Proceedings	18	15	0.10
19	Glossary	16	16	0.09
20	Reports	16	16	0.09
21	Magazine	14	17	0.08
22	Papers	13	18	0.07
23	Index	12	19	0.07
24	Standards.	12	19	0.07
25	Guide	12	19	0.07
26	Manual	11	20	0.06
27	Annual Reports	10	21	0.06
28	M Phil Thesis	10	21	0.06
29	Monograph	10	21	0.06
30	Personal Communication	10	21	0.06
31	Council	7	22	0.04
32	Manuscript	7	22	0.04
33	Technical Report	6	23	0.03
34	Annual Meeting	6	23	0.03
35	Guest lecture	6	23	0.03
36	News Letter	6	23	0.03
37	Online Database	6	23	0.03
38	Raw Material	6	23	0.03
39	Seminars	6	23	0.03
40	Survey	5	24	0.03
41	Workshop	5	24	0.03
42	Documents Not Mentioned	36	*	0.20
<b>Total</b>		<b>18065</b>		<b>100.00</b>

**Figure No. 1 Form wise Distributions of Citation**



It was seen that different forms of literature was used by researcher in Indian Journal of Chemistry Volume-B which heavily depend on periodicals sources for their studies. It was found that the journals are the major form of media used with citation count, of 15794 (87.43%) of total literature used, where as non-periodical sources account for 2271(12.57%) therefore periodicals are the first hand original and latest information in the subject and are most preferred channel of information use. Amongst citations of non periodical sources book occupy 1165 (6.45%) of citations, while the abstract occupy 229 (1.27%) and remaining 877 (4.85%) of literature contributes patents, text books, websites, handbooks ,Ph.D thesis, bulletin, conference, encyclopedia, symposium, laboratory manual, dictionary, unpublished work, laboratory standards, review, proceedings, glossary, report,

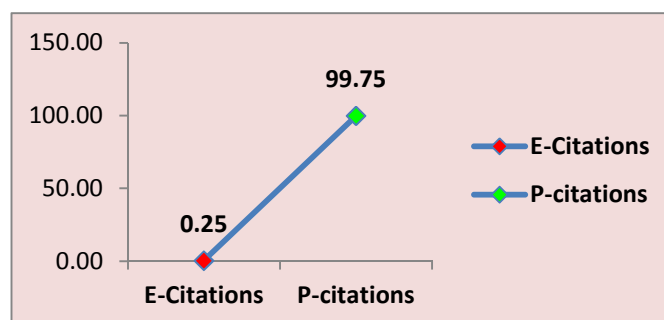
magazine, papers, index, standards, guide, manual, annual reports, M.Phil thesis, monograph, personal communication, council, manuscript, technical report ,annual meeting, guest lecture, news letter, online database ,raw material, seminars, survey, workshop, and documents not mentioned etc.

**DISTRIBUTION OF E-CITATIONS AND P-CITATIONS**

**Table No. 3 Distribution of E-Citations and P-Citations**

Sr. No.	Type of Citations	Citations	Percentage
1	E-Citations	45	0.25
2	P-citations	18020	99.75
	<b>Total</b>	<b>18065</b>	<b>100.00</b>

**Figure No. 2 Distribution of E-Citations and P-Citations**



The table No. 3 and figure No. 2 shows that of the total number of 18065 citations, 18020 (99.75%) are printed citations whereas 45 (0.25%) are electronic citations, which indicates that the researchers depend mostly on printed literature than the electronic form of literature.

## CHRONOLOGICAL DISTRIBUTIONS OF CITATIONS

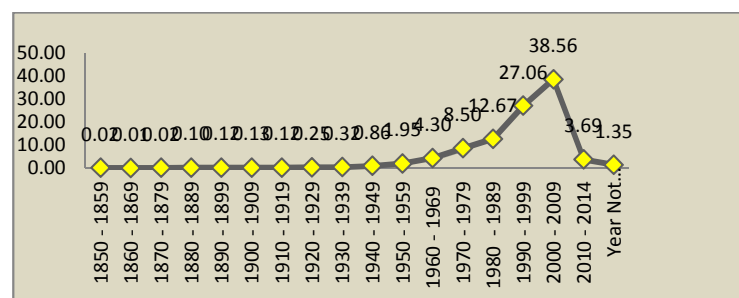
**Table No. 4 Chronological Distribution of Citations**

Sr.No	Year	Citations	Percentage
1	1850 - 1859	3	0.02
2	1860 - 1869	2	0.01
3	1870 - 1879	3	0.02
4	1880 - 1889	18	0.10
5	1890 - 1899	21	0.12
6	1900 - 1909	23	0.13
7	1910 - 1919	21	0.12
8	1920 - 1929	45	0.25
9	1930 - 1939	58	0.32
10	1940 - 1949	155	0.86
11	1950 - 1959	353	1.95
12	1960 - 1969	777	4.30
13	1970 - 1979	1536	8.50
14	1980 - 1989	2288	12.67
15	1990 - 1999	4888	27.06
16	2000 - 2009	6965	38.56
17	2010 - 2014	666	3.69
18	Year Not Mentioned	243	1.35
	<b>Total</b>	<b>18065</b>	<b>100.00</b>

The period-wise distribution of citations was measured by number of year which elapsed between the publications of a cited document. The whole time span of the documents is used. It was divided into period groups; each group has 10 years duration. The total 10 volumes of The

Indian Journal of Chemistry Volume-B were distributed in different chronological distribution of citations as shown in table No. 4 and figure No. 3

**Figure No.3 Chronological Distribution of Citations**



The table No. 4 shows that the citations are divided into 10 periods of ten years each. The maximum number of citations are covered during the period of 2000-2009 accounting to 6965 (38.56%), followed by year 1990-1999 accounting to 4888 (27.06%) and in the period of 1980-1989 accounting to 2288 (12.67%) citations in term of chronological distribution of citations and least number of citations followed by the year 1860-1869, accounting to 02 citations respectively.

### AUTHORSHIP PATTERN OF CITATIONS

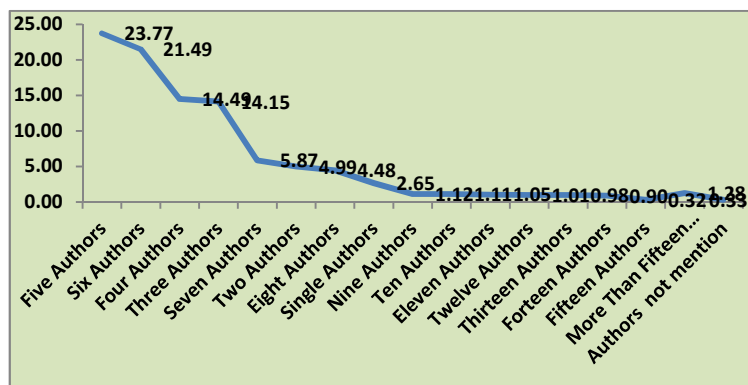
The characteristics of any subject literature include not only the basic publishing pattern but that of authors themselves so the authors were analyzed to determine the percentage of five, six, four and three authors. In order to have a clear picture the result of analysis of authors are presented. The total numbers of 18065 citations in 10 volumes of Indian journal of Chemistry volume-B in the period 2005 to 2014 were written by single author, two authors, three authors, four authors, five authors, six authors, seven authors,

eight authors, nine authors, ten authors, eleven authors, twelve authors, thirteen authors, fourteen authors, fifteen authors and more than fifteen authors are shown in the table No. 5 and figure No. 4

**Table No.5 Authorship Pattern of Citations**

Sr. No	Number of Authors	Citations	Percentage
1	Five Authors	4294	23.77
2	Six Authors	3883	21.49
3	Four Authors	2618	14.49
4	Three Authors	2557	14.15
5	Seven Authors	1060	5.87
6	Two Authors	902	4.99
7	Eight Authors	809	4.48
8	Single Authors	479	2.65
9	Nine Authors	202	1.12
10	Ten Authors	201	1.11
11	Eleven Authors	189	1.05
12	Twelve Authors	183	1.01
13	Thirteen Authors	177	0.98
14	Forteen Authors	163	0.90
15	Fifteen Authors	57	0.32
16	More Than Fifteen Authors	232	1.28
17	Authors not mention	59	0.33
	<b>Total</b>	<b>18065</b>	<b>100.00</b>

**Figure No.4 Authorship Pattern of Citations**



The characteristics of any subject literature include not only the basic publishing pattern but that of authors themselves so the authors were analyzed to determine the percentage of single author, two authors, three authors, four authors, five authors, six authors, seven authors, eight authors, nine authors, ten authors, eleven authors, twelve authors, thirteen authors, fourteen authors, fifteen authors and more than fifteen authors and authors are not mentioned in some citations. In order to have a clear picture the result of analysis of authors are presented. The table no. 5 and figure no. 4 indicates that out of total number of 18065 citations 4294 (23.77%) are by five authors, followed by 3883 (21.49%) citations by six authors, 2618 (14.49%) citations have four authors. The finding also shows that the least citations are by fifteen authors i.e. 57 (0.32%) citations respectively

**RANKING OF AUTHORS**

The authors who are highly cited in documents, those documents are most important to keep in the library. The purpose of author ranking is essential

for the librarian as well as researchers. The rank lists of cited authors are taken from 18065 citations from various from of cited documents. The authors were grouped into different ranks, according to their frequency occurrence in the total citations. The author ranking is shown in table No. 6

**Table No.6 Ranking of Authors**

Sr. No.	Authors Name	Cititions	Rank	Percentage
1	Varma R S	244	1	0.36
2	Kidwai M	218	2	0.32
3	Yadav J S	206	3	0.30
4	Sureshababu V V	199	4	0.29
5	Kumar A	197	5	0.29
6	Srikrishna A	197	5	0.29
7	Kappe C O	188	6	0.28
8	Rajananender E,	181	7	0.27
9	Desai N C	180	8	0.27
10	Bodor N	176	9	0.26
	<b>Less Than 176 Cited authors</b>	<b>33930</b>		<b>50.00</b>
	<b>Authors not mentioned</b>	<b>59</b>		<b>0.09</b>
	<b>Less Than ten authors cited</b>	<b>31882</b>		<b>46.98</b>
	<b>Total Cited Authors</b>	<b>67857</b>		<b>100.00</b>

The author who is most preferred by researchers, that documents are most important to keep in the library. The purpose of author ranking is essential to librarians as well as researchers. The author top

ten has been considered in the above table. "Varma R S" scores the top position with 244 (0.36 %) citations; second rank goes to "Kidwai M" with 218 (0.32 %) citations, followed by "Yadav J S" with 206 (0.30 %) citations respectively.

#### **RANKING OF PUBLISHERS**

The publishers are the most important in finding the information source where it is surely available. The researcher of Indian Journal of Chemistry (Volume-B) used various forms of information sources which are published by various kinds of publishers. The ranking of publishers is arranged on the basis of the number of times it was referred.

**Table No.7 Ranking of Publishers**

Sr. No	Name of Publishers	Cititions	Rank	Percentage
1	Academic Press	123	1	0.68
2	John Wiley and Sons	93	3	0.51
3	Wiley	75	4	0.42
4	Pergamon Press	66	5	0.37
5	VCH Publishers	39	6	0.22
6	Wiley-Inter science Publication	33	7	0.18
7	Wiley-VCH	29	8	0.16
8	CRC Press	28	9	0.15
9	Pergamon	27	10	0.15
	<b>Less than 27 times publishers</b>	<b>812</b>		<b>4.49</b>
	<b>Not Mentioned</b>	<b>16740</b>		<b>92.67</b>

	<b>Publishers</b>			
	<b>Total Cited Publishers</b>	<b>18065</b>		<b>100.00</b>

Table No. 7 shows the ranking of publishers. The publisher “Academic Press.” scores the top position with 123 (0.68%) citations, second rank goes to “John Wiley and Sons” With 93 (0.51%) citations, followed by “Wiley” with 75 (0.42%) citations respectively.

### GEOGRAPHICAL DISTRIBUTION OF CITATIONS

The total number of 18065 cited documents in 120 issues in 10 volumes are distributed in different a geographical area which is shown in table No.8 and figure No.5 geographical distribution of citations provides information of the ranking of countries active in the particular subject field and their relative contributions..

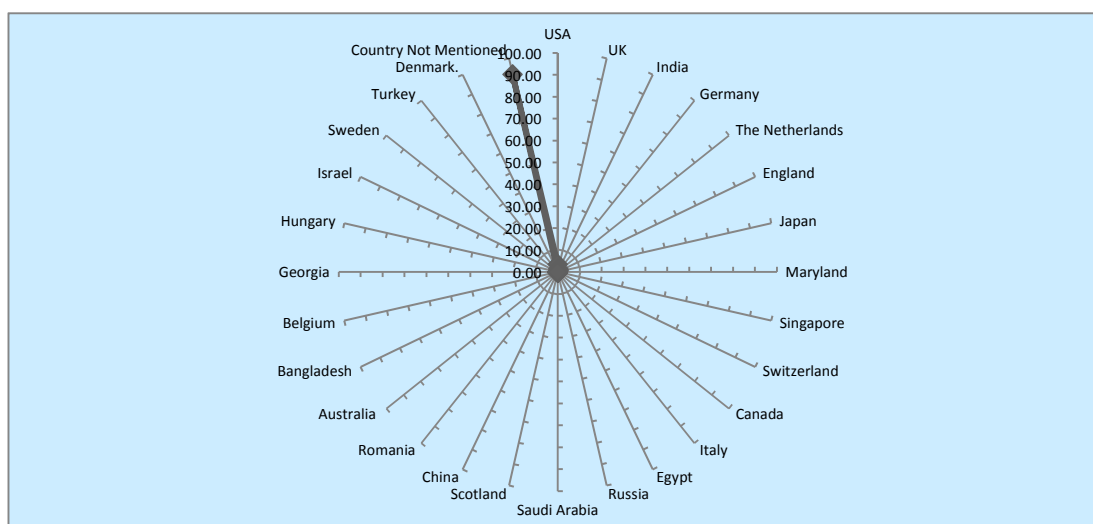
**Table No. 8 Geographical Distribution of Citations**

Sr.No.	Country	Citations	Rank	Percentage
1	USA	638	1	3.53
2	UK	281	2	1.56
3	India	206	3	1.14
4	Germany	114	4	0.63
5	The Netherlands	39	5	0.22
6	England	14	6	0.08
7	Japan	8	7	0.04
8	Maryland	6	8	0.03
9	Singapore	5	9	0.03
10	Switzerland	5	9	0.03
11	Canada	4	10	0.02
12	Italy	4	10	0.02
13	Egypt	3	11	0.02
14	Russia	3	11	0.02
15	Saudi Arabia	3	11	0.02
16	Scotland	3	11	0.02
17	China	2	12	0.01
18	Romania	2	12	0.01



19	Australia	1	13	0.01
20	Bangladesh	1	13	0.01
21	Belgium	1	13	0.01
22	Georgia	1	13	0.01
23	Hungary	1	13	0.01
24	Israel	1	13	0.01
25	Sweden	1	13	0.01
26	Turkey	1	13	0.01
27	Denmark.	1	13	0.01
28	<b>Country Not Mentioned</b>	<b>16716</b>		<b>92.53</b>
	<b>Total</b>	<b>18065</b>		<b>100.00</b>

**Figure No. 5 Geographical Distribution of Citations**



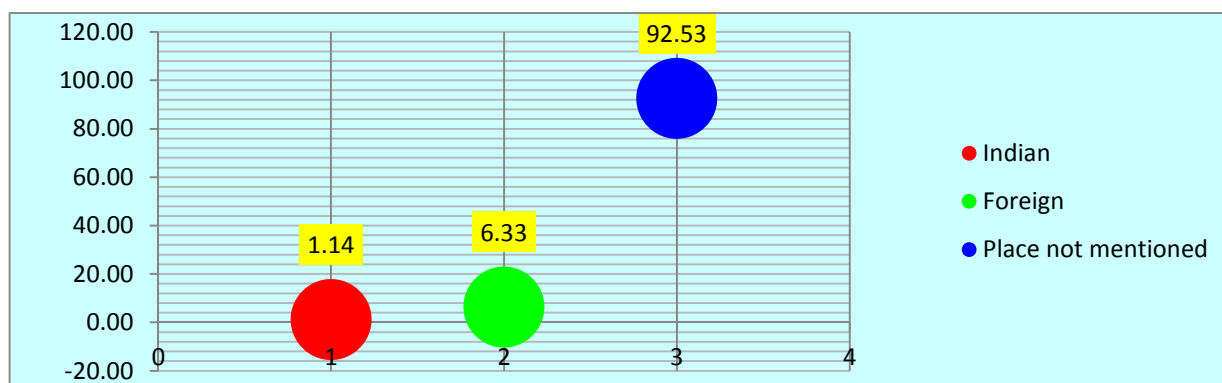
The table No.8 and figure No. 5 shows the geographical analysis of citations provide information of the range of countries active in field and their relative contribution. It was found that in the present study in all there were 27 countries involved in the research activity during the period which gives the ranking of more geographical distribution of citations. USA topped the rank with 638 (3.53%) Citations, second rank goes to UK with 281 (1.56%) citations, third rank goes to India with 206 (1.14 %) citations, forth rank goes to Germany with 114 (0.63%) citations and some of citations have not given the country of publications that is 16716 (92.53%).

**USE OF INDIAN AND FOREIGN LITERATURE**

**Table No.9 Use of Indian and Foreign Literature**

Sr. No.	Geographical Area	Citations	Percentage
1	Indian	206	1.14
2	Foreign	1143	6.33
3	Place not mentioned	16716	92.53
	<b>Total</b>	<b>18065</b>	<b>100.00</b>

**Figure No.6 Use of Indian and Foreign Literature**



The table No. 9 and figure No. 6 show the geographical distribution of Indian and foreign countries coverage. Out of 18065 citations, Indian citations are 206 (1.14%) and remaining 1143(6.33%) citations are foreign citations whereas in 16716 (92.53%) citations place is not mentioned.

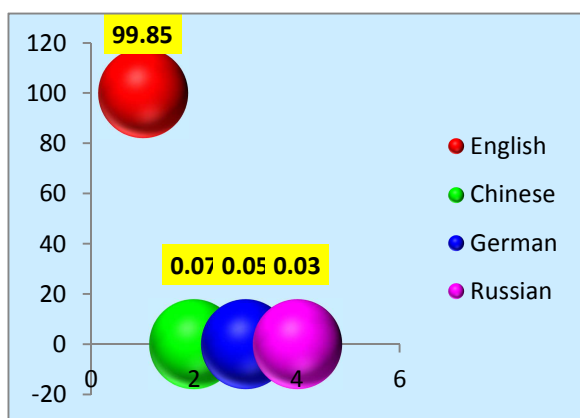
**LANGUAGE WISE DISTRIBUTION OF CITATION**

The total number of 18065 citations of 10 volumes of Indian Journal of Chemistry volume-B was distributed among four different languages as shown in table No. 10 and figure No. 7

**Table No. 10 Language Wise Distribution of Citation**

Sr.No	Language	Citations	Rank	Percentage
1	English	18038	1	99.85
2	Chinese	12	2	0.07
3	German	9	3	0.05
4	Russian	6	4	0.03
	<b>Total</b>	<b>18065</b>		<b>100.00</b>

**Figure No. 7 Language Wise Distribution of Citation**



It was seen that the citations appeared in Multilanguage .The table shows that 18038 (99.85%) documents were cited in English language, 12 (0.07%) documents were cited in Chinese language, German 9(0.05%) while remaining 6 (0.03%) documents were cited in Russian language.

**RANKING OF CITED JOURNAL**

The ranking list of cited journals are as serials assists libraries and researchers to select the serials of maximum utility in relation to their coverage of new and important literature in a particular subject area. The table No. 11 Shows the top ten ranking list of cited journals.

**Table No. 11 Ranking of the Cited Journals**

Sr.No	Journals	Citations	Rank	Percentage
1	Tetrahedron Letters	961	1	6.08
2	Indian Journal of Chemistry	955	2	6.05
3	J Org Chem	792	3	5.01
4	J Med Chem	729	4	4.62
5	Journal of American Chemical Society	663	5	4.20
6	Tetrahedron	467	6	2.96
7	Bioorganic and Medicinal Chemistry Letters	391	7	2.48
8	European Journal of Medicinal Chemistry	294	8	1.86
9	Synth Commun	268	9	1.70
10	Synthesis	252	10	1.60
	Less than 252 cited journals	10022		63.45
	<b>Total Cited Journals</b>	<b>15794</b>		<b>100.00</b>

The rank list of journals is essentially a practical tool designed to help the librarian and research scientist to select the journals of maximum utility in relation to their coverage of new and important literature in particular subject area. The journals are most preferred publication used by the researcher in their study. The journals which are cited top 10 have been considered in the above

table. "Tetrahedron Letters." scores the top position with 961 (6.08%) citations; second rank goes to "Indian Journal of Chemistry" with 955 (6.05 %) citations, followed by "J Org Chem." with 792 (5.01%) citations respectively.

### RANKING OF BOOKS

As books are the most reliable medium for communications and spread of knowledge. The researchers used books as source of studies. Out of 18065 citations, 1165 citations are book citations. The ranking of the top ten are arranged on the basis of the number of times it was referred.

**Table No. 12. Ranking of the Cited Books**

Sr.No	Title of Books	Citations	Rank	Percentage
1	Comprehensive Heterocyclic Chemistry	36	1	3.09
2	Spectrometric Identification of Organic Compounds	14	2	1.20
3	Analytical Microbiology	12	3	1.03
4	The Chemistry of Heterocyclic Compounds	12	3	1.03
5	Burger's Medicinal Chemistry and Drug Discovery	11	4	0.94

6	Comprehensive Organic Synthesis	11	4	0.94
7	1,3-Dipolar Cycloaddition Chemistry	10	5	0.86
8	Comprehensive Organic Chemistry	10	5	0.86
9	Gaussian	10	5	0.86
10	The Chemistry of Indoles	10	5	0.86
<b>Less Than 10 Books Cited</b>		<b>102</b>		
		<b>9</b>		<b>88.33</b>
<b>Total Cited Books</b>		<b>116</b>		<b>100.0</b>
		<b>5</b>		<b>0</b>

Table No. 12 shows the ranking of popular books in Indian Journal of Chemistry (volume-B). The books which have been cited top ten given in the above table. The book "Comprehensive Heterocyclic Chemistry" scores the top position with 36 (3.09%) citations; second rank goes to "Spectrometric Identification of Organic Compounds" with 14 (1.20%) citations, followed by "Analytical Microbiology" with 12 (1.03%) citations respectively.

### Conclusion:-

Journals are the major form of document; maximum numbers of citations are p-citations, maximum numbers of citations are covered during the period of 2000-2009, multi author citations are maximum compared to single, in author ranking Varma R S scores the top position, In ranking of

publishers academic press scores the top position compared to other, geographical distribution of citations country USA scored the top position, language wise distribution shows that the English is an predominant language, in journal ranking Tetrahedron Letters Scores the top position compared to other journals, in book ranking Comprehensive Heterocyclic Chemistry scores the top position compared to other books.

### References

- Baker, S.L. & Lancaster, F.W. (1991). Measurement and Evaluation of Library services, Information Resources Press. Arlington.
- Balasubramanian, S. and Bhaskar, P.A. (1984). Citation analysis in Neurology from the point of view of Indian Scientists. IASLIC Bulletin, 29(2), 63-67  
College and research Libraries, 46(1), 30-35
- Chen, K. (2004). The construction of the Taiwan Humanities citation Index. Online Information Review, 28(6), 410-419.
- Norris, M. and Oppenheim, (2003). Citation count and the Research Assessment Exercise V. Journal of Documentation, 59(6), 709-730.
- Wormell, I. (1998), Informatics: an emerging sub discipline in information science. Asian Libraries, 7(10), 257-268.