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# CITATION ANALYSIS OF CHEMISTRY LITERATURE CITED IN DOCTORAL THESES SUBMITTED IN NATIONAL INSTITUTE OF TECHNOLOGY, HAMIRPUR (HIMACHAL PRADESH)

Nandini Sharma Research Scholar, Deptt. of Library & Information Science, Kurukshetra Email: <u>sharma.nandini14@gmail.com</u>

**Abstract:** The present research paper contains 2925 citations that have been taken from 10 Doctoral theses in Chemistry admitted to National Institute of Technology, Hamirpur, from 2008-2015. Aim of the present study is to find out the year wise distribution of Chemistry Doctoral theses, form of cited documents, authorship pattern and collaborative research trend, obsolescence of cited journals and books, chronological distribution of citations and preparing ranking of journals in the field of Chemistry. The study reveals that journals were the most cited documents and "Journal of Applied Polymer Science" was the most cited journal as cited 228 (8.31%) times. Majority of the studies were conducted by three authors. It can be concluded that this study will provide a reliable base to the librarians of NIT's while planning selection and acquisition of the relevant reading material in the subject of Chemistry.

Keywords: Citation analysis, Chemistry, NIT

## **1.0 Introduction**

In the present times the economic conditions are causing adverse effect on planning budgetary provisions for the Libraries & Information Centers and due to this resource crunch, the librarians are facing a number of problematic situations in taking decision regarding the acquisition of the books and journals, as to which books and journals are be retained and which are to be dropped from the subscription list. The reading and research material being again and again demanded by the researchers, students and the faculty will help in determining the type of literature a library should have. Librarians make use of various tools including varied metrics and then on the basis of that take decisions how the collection is to be developed.

Citation analysis is a technique to measure the effect of an author, an article, a publication by calculating the frequency of their occurrence in other works. This study has analyzed Citations appended in 10 theses of <u>Chemistry</u>, submitted to <u>National Institute</u> of Technology, Hamirpur, from 2008-2015.

#### 2.0 Review of Literature

A number of studies have already been completed on citation analysis. Followings are a few studies conducted on the topic:-

**Chaubey (2019)** analyzed the citation and authorship pattern of Journal of Chemical Science (JLS), Pramana Journal of Physics (PJP) and Proceedings Mathematical Science (PMS). SCOPUS database was the main source for collecting data on this topic. Total 18600 articles with citations from 262 issues of 62 volumes were analyzed. The study revealed that PJP and JCS had authorship by more than three authors. While in PMS majority of the authorship was two authors. Journal articles in JCS (95.59%), PMS (84.46%) and PJP (61.32%) were the most cited source.

**Borthakur (2015)** performed a research on the topic "Citation analysis of Theses and Dissertations in Chemistry" submitted to the LNB Library, Dibrugarh University, during 2009-2013. The study concluded that 36.96 % (1902 out of 5145) citations were by more than three authors .The number of cited journals is highest (82.68%) followed by books (14.90%), technical reports (0.79%), web resources (0.66%), seminar conferences (0.62%) and Ph.D. theses (0.33%) "Journal of American Chemical Society" has been ranked first among the 24 core journals in Chemistry.

**Gohain and Saikia (2014)** in their study entitled "Citation analysis of Ph.D. theses submitted to the Department of Chemical Sciences, Tezpur University, Assam." The study analyzed 10983 citations of 30 Doctoral theses which were admitted for the award of Ph.D. degree between 2008-2012. Aim of the research was to assess the authorship pattern, list of core journals used in the subject of chemical sciences, and form & type of literature citied. The study revealed that 39.89% of citations of 8658 journal citations were by more than three authors

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whereas 22.28% of citations were by two authors. "Journal of American Chemical Society" was used to the maximum. Journals were having the maximum citations i.e. 78.83% whereas books had 15.57% citations. 3.0 Objectives of the study

The objectives of the study were to:

- 1. Find out the year wise distribution of Doctoral theses in Chemistry submitted in the NIT Hamirpur.
- 2. Know the form of cited documents in Doctoral theses of Chemistry.
- 3. Determine the authorship pattern and collaborative research trend in Chemistry.
- 4. Analyze the obsolescence of cited journals and books.
- 5. Know the chronological distribution of citations.
- 6. Prepare a ranking of journals in the field of Chemistry.

## 4.0 Research methodology

Total 10 theses of Chemistry submitted to National Institute of Technology, Hamirpur, from 2008-2015 were the main source of data collection. Total 2925 citations were analyzed. After collecting the data MS-Excel was used for analyzing it by applying suitable statistical techniques.

### 5.0 Data Analysis

Table 5.1: Year wise Distribution of Citations						
Year	No of Doctoral theses submitted	%				
2008	1	10				
2009	1	10				
2010	0	0				
2011	0	0				
2012	1	10				
2013	1	10				
2014	3	30				
2015	3	30				

Table 5.1 shows the year wise submission of Ph.D. theses in the Department of Chemistry at National Institute of Technology (Hamirpur) during 2008- 2015. The result shows that 3 (30%) theses were submitted in 2014 and 2015 and out of 10 no thesis was submitted during the year 2010 and 2011.

Table 5.2. Form of theu uocuments						
Form	No. of	Cumulative	%	Cumulative		
	Citations	count		%		
Journals	2743	2743	93.7	93.7		
Book	127	2870	4.34	98.04		
Proceedings	27	2897	0.92	98.96		
Handbook	4	2901	0.13	99.09		
Report	6	2906	0.20	99.29		
Encyclopedia	1	2911	0.03	99.32		
<b>IPPTA Convention Issue</b>	1	2915	0.03	99.35		
Patents	4	2919	0.13	99.48		
Symposium	12	2925	0.42	100		
	2925					

#### Table 5 2. Form of sited decomments

Table 5.2 Indicates that highest citations were from journals i.e. 2743 (93.7%), followed by 127 (4.34%) citation from books, 27 (0.92%) from proceeding, 12 (0.42%) from symposium respectively.

Authors	Citations	Cumulative % Citation		Cumulative %
1	208	208	7.58	7.58
2	659	867	24.02	31.6
3	721	1588	26.28	57.88
4	700	2288	25.51	83.39

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More than 4	455	2743	16.58	100
Total	2743		100	

Table 5.3 reveals that maximum number of the citations i.e. 721 (26.28%) were by three authors followed by 700 (25.51%), 659 (24.02%) and 455 (16.5%) citations by four authors, two authors and more than four authors respectively whereas 208 (7.58%) citations were by single author.

#### % of cumulative Number of Cumulative Age in % Citations Citations Citations Years 1.12 3.12 2.36 5.48 9.14 3.66 5.07 14.21 4.84 19.05 25.05 10.80 35.85 7.73 43.58 49.36 5.78 5.72 55.08 4.07 59.15 63.34 4.19 3.78 67.12 3.30 70.42 2.71 73.13 1.7174.84 2.59 77.43 1.47 78.9 80.37 1.47 1.71 82.08 84.08 86.08 88.08 89.08 1.18 90.26 91.26 92.26 1. 1. 93.26 >30<94

 Table 5. 4: Obsolescence of journal articles cited in the Ph.D. theses

Table 5.4 Indicates that 127 (9.14%) journals were of 5 years age and half-life of journals in Chemistry is 12 years.

	Table 5.5: Obsolescence of books cited in the Ph.D. theses					
Age in Years	Number of Citations	Cumulative Citations	Percentage	Percentage of cumulative Citations		
1	1	1	1.36	1.36		
2	3	4	4.10	5.46		
3	1	5	1.36	6.82		
4	3	8	4.10	10.92		
5	3	11	4.10	15.02		
6	6	17	8.21	23.23		
7	1	18	1.36	24.59		
8	1	19	1.36	25.95		
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9	3	22	4.10	30.05
10	3	25	4.10	34.15
11	5	30	6.84	40.99
12	2	32	2.73	43.72
13	2	34	2.73	46.45
14	3	37	4.10	50.55
15	1	38	1.36	51.91
16	2	40	2.73	54.64
17	1	41	1.36	56
18	3	44	4.10	60.10
19	1	45	1.36	61.46
20	5	50	6.84	68.3
21	4	54	5.47	73.77
22	1	55	1.36	75.13
23	1	56	1.36	76.49
24	3	59	4.10	80.59
25	2	61	2.73	83.32
26	3	64	4.10	87.42
27	1	65	1.36	88.78
28	1	66	1.36	90.14
29	1	67	1.36	91.5
30	1	68	1.36	92.86
>30<94	5	73	6.84	100

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Table 5.5 shows that 11 (15.02%) citations are only 5 years age and half-life of books is 14 years.

Decade	Frequency of	Cumulative %		Cumulative %
	Occurrence	Frequency		
Before 1965	12	12	0.43	0.43
1965-1974	39	51	1.42	1.85
1974-1983	139	190	5.06	6.91
1983-1992	299	489	10.90	17.81
1992-2001	689	1178	25.11	42.92
2001-2010	1355	2533	49.39	92.31
2010-2014	210	2743	7.65	100

Table 5.6. Chronological distribution of citations to journals in Chemistry

Chronological distribution of cited journals among the total number i.e.2743 is given in table 5.6 which reveals that 1355 (49.39%) pertain to the period of 2001-2010 followed by 689 (25.11%), 299 (10.90%), 210 (7.65%) and 139 (5.06%) belonged to the period 1992- 2001, 1983-1992, 2010-2014 and 1974-1983 respectively.

Table 5.7:	Geographical	distribution	of	Citations
I able corre	Geographical		•••	Citations

Country	Counts	Cumulative % Counts		Cumulative %
USA	734	734	26.75	26.75
UK	695	1429	1429 25.33	
NETHERLANDS	286	1715	10.42	62.5
India	275	1990	10.02	72.52
Hungary 99		2089	3.97	76.49
Others	654	2743	23.84	100

Table 5.7 reveals that 275 (10.02%) citations of journals were from Indian publications whereas 734 (26.75%) belong to other countries.

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Sr. No	Title	Citations	Cumulative	%	Cumulative	Rank
110.			Citations		70	
1	Journal of Applied Polymer Science	228	228	8.31	8.31	1
2	Biochemistry	105	333	3.82	12.13	2
3	Macromolecules	73	406	2.66	14.79	3
4	Composites Science & Technology	70	476	2.55	17.34	4
5	Radiation Physics & Chemistry	65	541	2.36	19.7	5
6	Carbohydrate Polymer	60	601	2.18	21.88	6
7	Biomaterials	59	660	2.15	24.03	7
8	Polymer Composites	55	715	1.82	25.85	8
9	International Journal of Pharmaceutics	50	765	1.82	27.67	9
10	Polymer	50	815	1.82	29.49	9
11	Bioresources	45	860	1.64	31.13	10
12	European Polymer Journal	42	902	1.53	32.66	11
13	Bio macromolecules	42	944	1.53	34.19	11
14	Journal of Controlled Release	41	985	1.49	35.68	12
15	Nature	40	1025	1.49	37.17	13
16	Composites :Part A	38	1063	1.38	38.55	14
17	Polymer International	35	1098	1.27	39.82	15
18	Journal of the American Association of Pharmaceutical	35	1133	1.27	41.09	15
19	Journal of American Chemical Society	35	1168	1.27	42.36	15
20	Journal of Reinforced Plastic & Composites	30	1198	1.09	43.45	16
21	Polymer Degradation & Stability	30	1228	1.09	44.54	16
22	Reactive & Functional Polymers	28	1256	1.02	45.56	17
23	European Journal of Pharmaceutics & Bio pharmaceutics	25	1281	0.91	46.47	18
24	Express Polymer Letters	25	1306	0.91	47.37	18
25	Polymer Journal	20	1326	0.72	48.09	19
26	Others	1417	2743	51.65	100	20

## Table 5.8: Ranked list of highly cited journals in Chemistry

Table 5.8 "Journal of Applied Polymer Science" was the most cited journal as cited by 228 (8.31%) times followed by "Biochemistry" which has been cited 105 (3.82%) times whereas "Polymer Journal" has been cited least number of times i.e. 20 (0.72%).

## 6.0 Findings of the Study

The findings of the study are as follows:

- 1. Maximum number of theses i.e. 3 (30%) were submitted in 2014 and 2015 whereas no thesis was submitted during the year 2010 and 2011. (Table 5.1)
- 2. Out of 2925 citations cited in the Ph.D. theses submitted in the Department of Chemistry, highest citations were from journals i.e. 2743 (93.7%). (Table 5.2)
- 3. Majority of the citations i.e. 721 (26.28%) were by three authors whereas least number of citations i.e. 208 (7.58%) were by single author. (Table 5.3)
- 4. Half-life of journals is 14 years in the field of Chemistry. (Table 5.4)
- 5. Half-life of books in the field of Chemistry is 14 years. (Table 5.5)

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- 6. Chronological distribution of cited journals among the total number i.e.2743 which reveals that 1355 (49.39%) pertain to the period of 2001-2010 (Table 5.6)
- 7. 275 (10.02%) citations of journals were from Indian publications whereas majority of the citations of journals i.e. 734 (26.75%) belong to other countries. (Table 5.7)
- 8. "Journal of Applied Polymer Science" was the most cited journal as cited 228 (8.31%) times whereas "Polymer Journal" has been cited least number of times i.e. 20 (0.72%). (Table 5.8)

## 7.0 Conclusion

It is evident from the analysis of citations appended in Ph.D. theses in Chemistry that enormous literature has been consulted by the researchers which is helpful in understanding their information need. Therefore, the present study will provide a reliable base to the librarians of NIT's while planning selection and acquisition of the relevant reading material in the subject of Chemistry.

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