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Bibliometric Analysis of Research Publications of Maharshi Dayanand University (Rohtak) During 2000-2013

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ABSTRACT

The study investigates the research contributions of Maharshi Dayanand University, Rohtak in terms of its publication output during 2000-2013 as reflected through Scopus database. The study analyses the year-wise research productivity, its citations impact, national and international collaborations, top collaborating institutions, subject-wise distribution of papers, journals used for communication, most preferred journals for publication, most prolific authors, number of citations received, and top cited papers of the University during the period under study.

Keywords: Maharshi Dayanand University, research productivity, bibliometrics

1. INTRODUCTION

Research is a structured enquiry that utilises acceptable scientific methodology to solve problems and create new knowledge. It is an investigation of finding solutions to scientific and social problems through objective and systematic analysis. Slesinger & Stephenson[1] in the Encyclopedia of Social Sciences define research as the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art. It is a process of collecting, analysing and interpreting information to answer questions. The growth in information communication technologies (ICTs) in general and electronic information resources in particular, have given impetus to research and related activities throughout the world.

Advancement in knowledge takes place through research publications in the form of journal articles, conference papers, and communications among others. The research activities of an institution are reflected through its publications. Analysis of these publications helps in providing a picture of the research productivity of that particular institution. There have been many bibliometric and scientometric studies to assess the research productivity of various disciplines as well as institutions. Jeevan & Gupta[2] provided a scientometric profile of research output from Indian Institute of Technology, Kharagpur. Kumbar[3], *et al.,* analysed the growth and impact of research output of University of Mysore during 1996-2006. Mukherjee[4] made an analysis of the scholarly literature from selected universities of Delhi and Uttar Pradesh. Kaur & Mahajan[5] made a comparative evaluation of research output of two pioneer institutions in medical sciences – AIIMS, New Delhi and PGIMER, Chandigarh. Kumbar and Gupta[6] analysed the contribution of Karnataka University in science and technology during 2001-10. Satish Kumar[7] did a quantitative analysis of research productivity of Maharshi Dayanand University in Chemistry during 2001-10. Baskaran[8] studied the research growth trend and author collaboration of Alagappa University during 1999-2011.

1.1 Maharshi Dayanand University, Rohtak

Maharshi Dayanand University (MDU), Rohtak is accredited with 'A' Grade by National Assessment and Accreditation Council (NAAC). The University came into existence by an Act No. 25 of 1975 of the Haryana Legislative Assembly in 1976 with the objective to promote inter-disciplinary higher education and research in the fields of environmental, ecological and life sciences. It was rechristened as Maharshi Dayanand University in 1977 after the name of a great visionary and social reformer, Maharshi Dayanand. It had a unitary and residential character in its nascent stage,

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but became an affiliating University in November 1978. The University secured the recognition of University Grants Commission, the higher education regulatory body of India, for Central Government grants in February 1983. The educational and research programmes in the University are offered through its 36 departments. Besides, the University runs some programmes through its University Institute of Law & Management Studies (ULIMS), Gurgaon. Over 490 institutions/colleges of general education, engineering, technology, computer sciences and management sciences located in 10 districts of the State are affiliated to this University.

2. OBJECTIVES

The main objectives of this study are to:

(a) Analyse the year-wise research productivity and growth of MDU publications

(b) Examine the national and international collaborations of MDU for research publications

(c) Examine the distribution of research output under different subject categories

(d) Analyse the most common journals used for communication

(e) Identify the most prolific authors of the University

(f) Study the citations received by the papers and to identify the highly cited papers

3. METHODOLOGY

The study is based on the publications data retrieved from Scopus database for the period 2000-2013. The string which was used to retrieve the relevant data on research productivity of MDU was: (AF-ID ('Maharshi Dayanand University' 60004880)) AND PUBYEAR >1999 AND PUBYEAR <2014). Only the journal articles, reviews and articles in press were considered for the study. The results obtained were refined to obtain relevant data regarding authors, institutions, source journals, etc. For calculating the international collaborative papers the affiliation field of each article was manually checked. For citations data, the citations received by the article since its publication were considered.

4. ANALYSIS

4.1 Year-wise Research Productivity of MDU

The MDU has published 1247 papers during the span of 14 years from 2000-2013. A steep rise in the number of publications is observed from 2009 onwards. In the year 2000 the university published only 36 papers while in 2013 it published 219 papers, highest among all the years (Table 1). The papers published during 4 years from 2010 to 2013 accounts for more than half of the papers published during 2004-2013. The papers published by the university during 2000-13 received 6959 citations with an average citation per paper (ACPP) of 5.58. The ACPP was the highest (13.20) in 2001, followed by 8.05 in 2005.

Table 1. Year-wise published paper in MDU

S. No.	Year	Total paper (%)	Average citation per paper	ICP (%)
1.	2000	36 (2.89)	6.39	2 (5.56)
2.	2001	30 (2.41)	13.20	2 (6.67)
3.	2002	51 (4.09)	7.59	1 (1.96)
4.	2003	65 (5.21)	7.31	4 (6.15)
5.	2004	60 (4.81)	7.03	4 (6.67)
6.	2005	78 (6.26)	8.05	12 (15.38)
7.	2006	57 (4.57)	7.46	14 (24.56)
8.	2007	63 (5.05)	7.71	12 (19.05)
9.	2008	71 (5.69)	7.54	12 (16.90)
10.	2009	66 (5.29)	7.32	7 (10.61)
11.	2010	104 (8.34)	5.83	11 (10.58)
12.	2011	154 (12.35)	5.66	16 (10.39)
13.	2012	193 (15.48)	3.53	25 (12.95)
14.	2013	219 (17.56)	1.52	32 (14.61)
Total		**1247** (**100**)	**5.58**	**154** (**12.35**)

4.2 National and International Collaborations

The authors affiliated to MDU have collaborated with authors of other institutes of India as well as other countries. The list of top institutions collaborating with MDU (having at least 10 collaborative papers) is shown in Table 2.

At the national level MDU has the highest number of collaborative papers with Guru Jambeshwar University of Science and Technology, Hisar (66 papers) which is followed by Kurukshetra University, Kurukshetra (45 papers). Other major institutions collaborating with MDU includes Prabhu Dayal Memorial Religious & Educational Association (25 papers), All India Jat Hero Memorial College, Rohtak (23 papers), National Physical Laboratory (20 papers), Institute of Genomics and Integrative Biology, University of Delhi and Hindu College (17 papers each). It was observed that the maximum Indian institutes with which MDU has top collaborations are in the same state, i.e., Haryana or in neighboring states and UTs like Delhi, Chandigarh, and Punjab.

At the international front, the university has the highest number of collaborative papers with South Korea (56 papers) and United States (26 papers). Other major collaborative countries include Spain (13 papers), Belgium (12 papers), Saudi Arabia (11 papers), Portugal and Malaysia (6 papers each). Out of a total of 1247 papers, MDU has collaborated with international institutions in 154 papers (12.35 %). The highest number of international collaborations

Table 2. Names of top institutions collaborating with MDU, 2000-2013

S. No.	Affiliation	Country	No. of papers
1.	Guru Jambeshwar University of Science and Technology, Hisar	India	66
2.	Kurukshetra University, Kurukshetra	India	45
3.	Korea Institute of Energy Research, Daejeon	Korea	39
4.	Prabhu Dayal Memorial Religious & Educational Association, Bahadurgarh	India	25
5.	A.I.J.H.M. College, Rohtak	India	23
6.	National Physical Laboratory, New Delhi	India	20
7.	Institute of Genomics and Integrative Biology, New Delhi	India	17
8.	Hindu College, Sonepat	India	17
9.	Yonsei University, Seoul	Korea	17
10.	University of Delhi, Delhi	India	17
11.	Dr. Harisingh Gour University, Sagar	India	16
12.	Pandit Bhagwat Dayal Sharma Postgraduate Institute of Medical Sciences, Rohtak	India	14
13.	Jamia Hamdard Faculty of Pharmacy, New Delhi	India	13
14.	Universidad Politecnica de Valencia, Valencia	Spain	12
15.	Guru Gobind Singh Indraprastha University, New Delhi	India	12
16.	Rega Institute for Medical Research, Leuven	Belgium	12
17.	ISF College of Pharmacy, Moga	India	11
18.	Punjabi University, Patiala	India	11
19.	Jawaharlal Nehru University, New Delhi	India	10
20.	Maharishi Markandeshwar University, Mullana	India	10
21.	Chaudhary Devi Lal University, Sirsa	India	10

has been in the years 2006, 2007, and 2008 with 24.56 %, 19.05 % and 16.90 % papers respectively. The least collaboration was in 2002 (one paper). The top international institute collaborating with MDU is Korea Institute of Energy Research (39 papers) which is followed by Yonsei University (17 papers), Rega Institute for Medical Research, Universidad Politecnica de Valencia, Spain (12 papers each), and Chungnam National University (6 papers).

The most collaborative authors of MDU who have international collaborative papers are K.C. Singh (21 papers), B. Narsimhan (17 papers), S.P. Khatkar (16 papers) and I. Singh (14 papers). Seven international collaborative papers were published in the journal 'Medicinal Chemistry Research' and 5 each in 'European Journal of Medicinal Chemistry', 'Journal of Luminescence', 'Materials Science and Engineering B: Solid State Materials for Advanced Technology' and 'Sensors and Actuators B: Chemical'.

4.3 Subject-wise Distribution of Papers

Scopus provides different subject categories to the articles based on its adopted classification method. The papers published by MDU can be divided into different subject categories as shown in Table 3. A paper may appear in more than one subject category, so the total of different subject categories exceeds the actual number of papers. The highest publications appear in the subject category Chemistry (455 papers). This indicates that the authors in chemistry and allied disciplines are more productive in terms of research publications. The other main subject categories are biochemistry, genetics and molecular biology (275 papers), pharmacology, toxicology and pharmaceutics (256 papers), agricultural and biological sciences (165 papers), physics and astronomy (139 papers) and engineering (111 papers). The ACPP is the highest for Computer Science (9.25) followed by Biochemistry, Genetics and Molecular Biology (7.19), Material Science (7.17) and Agricultural and Biological Sciences (7.01).

4.4 Preferred Common Journals for Communication

The authors of MDU have published their research work in 454 different national and international journals. There are 243 journals in which only one paper is published by authors of MDU. There are 78 journals in which 2 papers each are published. Three papers have appeared in 49 journals, 4 papers in 30 journals and 5 papers in 12 journals.

The list of top 18 most preferred journals of MDU having more than 10 publications is given in Table 4. These accounts for 27.11 % of the total publications which indicates that almost one-fourth of the total papers of MDU are published in these 18 journals. The most preferred journal for publication by MDU authors is Indian Journal of Heterocyclic

Table 3. Major subject categories

Subject	No. of papers (% share of documents)	Average citation per paper
Chemistry	455 (36.49)	6.09
Biochemistry, Genetics and Molecular Biology	275 (22.05)	7.19
Pharmacology, Toxicology and Pharmaceutics	256 (20.53)	4.88
Agricultural and Biological Sciences	165 (13.23)	7.01
Physics and Astronomy	139 (11.15)	6.63
Engineering	111 (8.90)	6.68
Materials Science	99 (7.94)	7.17
Chemical Engineering	97 (7.78)	3.96
Medicine	83 (6.66)	4.58
Environmental Science	81 (6.50)	5.56
Mathematics	73 (5.85)	5.81
Immunology and Microbiology	48 (3.85)	5.35
Social Sciences	40 (3.21)	1.65
Computer Science	36 (2.89)	9.25
Earth and Planetary Sciences	20 (1.60)	3.65
Arts and Humanities	14 (1.12)	0.14
Multidisciplinary	14 (1.12)	3.64

Note: One paper may fall under different subject categories, so the total exceeds the actual total number of papers

Table 4. Top 18 most productive journals of MDU (2000-2013)

S. No.	Journal name	Country	No. of papers	JCR IF (2013)	SJR (2013)	SNIP (2013)
1.	*Indian Journal of Heterocyclic Chemistry*	India	71	0.169	0.121	0.173
2.	*Indian Journal of Chemistry Section B Organic and Medicinal Chemistry*	India	30	0.689	0.318	0.609
3.	*Medicinal Chemistry Research*	United States	29	1.612	0.355	0.800
4.	*Thermochimica Acta*	Netherlands	20	1.989	0.645	1.490
5.	*Journal of Solution Chemistry*	United States	18	1.128	0.502	0.811
6.	*Indian Journal of Chemistry Section A Inorganic Physical Theoretical and Analytical Chemistry*	India	18	0.787	0.296	0.483
7.	*Asian Journal of Chemistry*	India	17	0.253	0.187	0.406
8.	*International Journal of Biological Macromolecules*	Netherlands	15	2.596	0.861	1.426
9.	*Physiology and Molecular Biology of Plants*	India	14		0.294	0.526
10.	*Indian Journal of Chemical Technology*	India	14	0.628	0.289	0.749
11.	*Arabian Journal of Chemistry*	Saudi Arabia	12	2.266	0.364	0.896
12.	*International Journal of Pharmacy and Pharmaceutical Sciences*	India	12	0.910	0.484	1.119
13.	*Journal of Molecular Liquids*	Netherlands	12	1.684	0.632	1.068
14.	*Journal of Environmental Biology*	India	12	0.682	0.342	0.921
15.	*Sensors and Actuators B Chemical*	Switzerland	11	3.535	1.312	1.627
16.	*Analytical Biochemistry*	United States	11	2.582	0.870	0.936
17.	*Indian Journal of Biochemistry and Biophysics*	India	11	1.026	0.371	0.674
18.	*Indian Journal of Experimental Biology*	India	11	1.195	0.436	0.842
Total papers in top 18 journals						**338**
Total papers of MDU						**1247**
Share of top 18 journals in MDU output (in %)						**27.11 %**

JCR IF= JCR impact factor, SJR= scimago journal rank, SNIP= Source normalized impact per paper

Chemistry followed by Indian Journal of Chemistry Section B: Organic and Medicinal Chemistry,Medicinal Chemistry Research and Thermochimica Acta. The authors of MDU have been consistently publishing articles in the Indian Journal of Heterocyclic Chemistry from 2000 to 2010 after which the number of publications in this journal declined. In the journal Medicinal Chemistry Research, out of the 29 articles published by authors of MDU, the maximum (20) were published in just one single year 2012.

Table 4 also shows the JCR impact factor (IF), SJR and SNIP values of the top 18 journals for the year 2013.

Journal citation reports offers a systematic, objective means to critically evaluate the world's leading journals, with quantifiable, statistical information based on citation data[9]. The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years[10]. SCImago journal rank (SJR) is a prestige metric based on the idea that 'all citations are not created equal'. With SJR, the subject field, quality and reputation of the journal have a direct effect on the value of a citations based on the total number of citations in a subject field[11]. The impact of a single citation is given higher value in subject areas where citations are less likely, and vice versa. It is defined as the ratio of a journal's citation count per paper and the citation potential in its subject field[12]. As a field-normalised metric SNIP offers researchers, authors, and librarians the ability to benchmark and compare journals from different subject areas. This is especially helpful to researchers publishing in multidisciplinary fields.

Among these 18 journals the top 5 with highest IF are Sensors and Actuators B-Chemical, International Journal of Biological Macromolecules,Analytical Biochemistry,Arabian Journal of Chemistry and Thermochimica Acta. The top 5 journals according to SJR are Sensors and Actuators B-Chemical, Analytical Biochemistry,International Journal of Biological Macromolecules, Thermochimica Acta and Journal of Molecular Liquids. According to SNIP values the top 5 journals are Sensors and Actuators B Chemical, Thermochimica Acta, International Journal of Biological Macromolecules, International Journal of Pharmacy and Pharmaceutical Sciences and Journal of Molecular Liquids. Thus, it is observed that the IF, SJR and SNIP are the highest for the journal ‘Sensors and Actuators B-Chemical.‘

4.5 Highly Prolific Authors

The authors having 25 or more publications during 2000-2013 are shown in Table 5 along with their number of papers, ACPP and *h*-index. The research activity seems to be highly skewed as the top 16 authors account for half (49.48 %) of the total publications of MDU. The average productivity of these 16 authors was 38. 7 authors

Table 5. Most productive authors of MDU from 2000-2013

S. No.	Author	Subject	No. of papers	ACPP	*h*-index
1.	Pundir, C.S.	Biochemistry	141	8.12	18
2.	Mohan, J.	Chemistry	65	3.02	8
3.	Sharma, V.K.	Chemistry	60	5.85	10
4.	Narsimhan, B.	Pharmaceutical Sciences	55	6.89	11
5.	Makrandi, J.K.	Chemistry	49	2.96	6
6.	Singh, I.	Chemistry	40	6.63	9
7.	Dureja, H.	Pharmaceutical Sciences	39	7.26	10
8.	Parkash, R.	Genetics	37	9.78	12
9.	Khatkar, S.P.	Chemistry	35	8.94	11
10.	Singh, K.C.	Chemistry	34	9.47	10
11.	Chauhan, N.	Biochemistry	32	10.41	12
12.	Yadav, J.P.	Genetics	29	6.86	8
13.	Narang, J.	Biochemistry	27	9.04	10
14.	Jaiwal, P.K.	Biotechnology	26	12.65	12
15.	Kumar, P.	Pharmaceutical Sciences	25	10.68	8
16.	Nanda, A.	Pharmaceutical Sciences	25	3.20	5
Total output of top 16 authors					**617***
Total of MDU					**1247**
Share of top 16 authors in university output					**49.48 %**

**Total is less as these 16 authors have collaborations among themselves also*

have scored higher research productivity than this average productivity.

Among these top 16 authors 6 are from Chemistry, 4 from Pharmaceutical Science, 3 from Biochemistry, 2 from Genetics and 1 from Biotechnology. C.S. Pundir, Department of Biochemistry is the most productive author of MDU in terms of publications with 141 publications and also has the highest *h*-index (18). The *h*-index, suggested by Jorge E. Hirsch in 2005, takes into account both the quantity and 'quality' (or impact) of publications and helps to identify distinguished scientists who publish a considerable number of highly cited papers. A scientist has index h if h of his or her no. of papers have at least *h* citations each and the other (Np−*h*) papers have ≤h citations each[13]. P.K. Jaiwal of Department of Biotechnology has the ACPP of 12.65.

4.6 Citation Profile and Highly Cited Papers

The distribution of citation data of MDU is shown in Table 6. It shows that 368 (29.51 %) papers did

Table 6. Citation profile of papers of MDU (2000-2013)

No. of citations	No. of papers
Zero Citations	368
1-5	519
6-10	155
11-15	88
16-20	33
21-25	26
26-30	21
31-35	10
36-40	9
41-45	5
46-50	3
51-55	3
56-60	3
>60	4
Total citations received	**6959**

Table 7. Highly cited authors

S. No.	Authors	Journal	No. of citations
1.	Verma, S., Mishra, S.N.	*Journal of Plant Physiology*, 2005, 162 (6), 669-677	99
2.	Gupta, S., Singh, M., Madan, A.K.	*Journal of Computer-Aided Molecular Design*, 2001, 15 (7), 671-678	72
3.	Gupta, S., Singh, M., Madan, A.K.	*Journal of Mathematical Analysis and Applications*, 2002, 266(2), 259-268	64
4.	Kaushik, D., Dureja, H., Saini, T.R.	*Indian Drugs*, 2004, 41 (4), 187-193	61
5.	Han, C.-H., Hong, D.-W., Kim, I.-J., Gwak, J., Han, S.-D., Singh, K.C.	*Sensors and Actuators, B: Chemical*, 2007, 128 (1), 320-325	60
6.	Kumar, V., Sardana, S., Madan, A.K.	*Journal of Molecular Modeling*, 2004, 10 (5-6), 399-407	59
7.	Sardana, S., Madan, A.K.	*Match*, 2001, 43, 85-98	58
8.	Sharma, D., Narasimhan, B., Kumar, P., Judge, V., Narang, R., De, Clercq E., Balzarini, J.	*European Journal of Medicinal Chemistry*, 2009, 44 (6), 2347-2353	54
9.	Han, C.-H., Hong, D.-W., Han, S.-D., Gwak, J., Singh, K.C.	*Sensors and Actuators, B: Chemical*, 2007, 125 (1), 224-228	52
10.	Singh, N.D., Sahoo, L., Sarin, N.B., Jaiwal, P.K.	*Plant Science*, 2003, 164 (3), 341-347	51
11.	Chugh, R., Kadian, T., Rani, A., Rhoades, B.E.	*Fixed Point Theory and Applications*, 2010	50
12.	Suman, S., Singhal, R., Sharma, A.L., Malthotra, B.D., Pundir, C.S.	*Sensors and Actuators, B: Chemical*, 2005, 107 (2), 768-772	49
13.	Karan, D., Dubey, S., Moreteau, B., Parkash, R., David, J.R.	*Genetica*, 2000, 108 (1), 91-100	46
14.	Jaiwal, P.K., Kumari, R., Ignacimuthu, S., Potrykus, I., Sautter, C.	*Plant Science*, 2001, 161 (2), 239-247	44
15.	Yadav, J., Saini, S., Kalia, A., Dangi, A.	*Indian Journal of Pharmacology,* 2008, 40 (1), 23-27	43
16.	Han, S.D., Khatkar, S.P., Taxak, V.B., Sharma, G., Kumar, D.	*Materials Science and Engineering B: Solid-State Materials for Advanced Technology*, 2006, 129 (1-3), 126-130	43

17.	Kumar, P., Narasimhan, B., Sharma, D., Judge, V., Narang, R.	*European Journal of Medicinal Chemistry*, 2009, 44 (5), 1853-1863	42
18.	Parkash, R., Rajpurohit, S., Ramniwas, S.	*Journal of Insect Physiology,* 2008, 54 (6), 1050-1056	42
19.	Narasimhan, B., Sharma, D., Kumar, P.	*Medicinal Chemistry Research*, 2012, 21 (3), 269-283	40
20.	Chauhan, N., Narang, J., Pundir, C.S.	*Analyst*, 2011, 136 (9), 1938-1945	39
21.	Han, C.-H., Han, S.-D., Gwak, J., Khatkar, S.P.	*Materials Letters*, 2007, 61 (8-9), 1701-1703	39
22.	Bajaj, S., Sambi, S.S., Madan, A.K.	*Journal of Molecular Structure: THEOCHEM*, 2004, 684 (1-3), 197-203	39
23.	Dhawan, K., Dhawan, S., Chhabra, S.	*Journal of Pharmacy and Pharmaceutical Sciences*, 2003, 6 (2), 215-222	39
24.	Chauhan, N., Pundir, C.S.	*Analytica Chimica Acta*, 2011, 701 (1), 66-74	38
25.	Khasa, S., Seth, V.P., Agarwal, A., Murali, Krishna R., Gupta, S.K., Chand, P.	*Materials Chemistry and Physics*, 2001, 72 (3), 366-373	37
26.	Yadav, J.P., Arya, V., Yadav, S., Panghal, M., Kumar, S., Dhankhar, S.	*Fitoterapia*, 2010, 81 (4), 223-230	35
27.	Han, C.-H., Han, S.-D., Singh, I., Toupance, T.	*Sensors and Actuators, B: Chemical*, 2005, 109 (2), 264-269	35
28.	Dureja, H., Gupta, S., Madan, A.K.	*Journal of Molecular Graphics and Modelling*, 2008, 26(6), 1020-1029	35
29.	Sardana, S., Madan, A.K.	*Journal of Molecular Modeling*, 2002, 8 (8), 258-265	35
30.	Gupta, S., Singh, M., Madan, A.K.	*Journal of Mathematical Analysis and Applications*, 2002, 275(1), 386-401	35

not receive any citation. The remaining 70.49 % papers received at least one or more citations. 10 papers received more than 50 citations. Table 7 gives the list of top 30 highly cited papers receiving 35 or more citations. These 30 papers have appeared in 23 different journals.

5. CONCLUSIONS

This study has explored the publishing behaviour of scholars of Maharshi Dayanand University. The fourteen year (2000-13) study examined the total number of 1247 papers in the manifestation of journal articles and reviews along with articles in press. The study indicates that the highest numbers of papers (219) were published in the year 2013 and lowest (30) in 2001. A steep rise in the research publications of MDU was observed during the last four years. The increasing research productivity of the University can be attributed, to some extent, to the increase in major and minor research projects being undertaken by the faculty members during the last few years. The average citation per paper (ACPP) of MDU papers was 5.58 and this was lodged highest (13.20) in 2001. Guru Jambeshwar University, Hisar was main collaborator with 66 papers followed by Kurukshetra University, Kurukshetra (45 papers). Among the international collaborations, two institutes of South Korea were in lead-Korea Institute of Energy Research (39 papers) and Yonsei University (17 papers). Chemistry has been the front runner as research subject of which the largest numbers of articles were published in *Indian Journal of Heterocyclic Chemistry*. Among the productive authors, C.S. Pundir of the Department of Biochemistry comes at front with the highest number of publications. P.K. Jaiwal of Department of Biotechnology was having largest citations per paper in terms of its average number. The paper by joint authors S. Verma and S.N. Mishra had the highest number of citations which cumulated into 99 in number. Out of 1247 papers, only 11 papers carried 50 or above citations. Uniform citation pattern was not observed in the results of the study.

REFERENCES

1. Slesinger, D. & Stephenson, M. The Encyclopaedia of Social Sciences Vol. IX. MacMillan, London, 1930.
2. Jeevan, V.K.J. & Gupta, B.M. A scientometric profile of research output from Indian Institute of Technology, Kharagpur. *Scientometrics*, 2002, **53**(1), 165-68.
3. Kumbar, Mallinath; Gupta, B.M. & Dhawan, S.M. Growth and impact of research output of University of Mysore, 1996-2006. *Annals Lib. Inf. Stu.*, 2008, **55** (5), 185-95.
4. Mukherjee, B. Scholarly literature from selected

Universities of Delhi and Uttar Pradesh: A pilot study. *LIBRES*, 2008, **18**(1), 1-14.

5. Kaur, Har & Mahajan, Preeti. Comparative evaluation of research output: AIIMS vs PGIMER. *DESIDOC J. Lib. Inf. Technol.*, 2012, **32**(6), 531-36.
6. Kumbar, B.D. & Gupta, B.M. Contribution of Karnataka University in science and technology: Research output and citation impact during 2001-10. *DESIDOC J. Lib. Inf. Technol.*, 2013, **33**(2), 114-24.
7. Satish Kumar. Quantitative analysis of research productivity of Maharshi Dayanand University in Chemistry during 2001-10. *Review of Research*, 2013, **3**(1).
8. Baskaran, C. Research growth trend and author collaboration of Alagappa University in India during 1999-2011. *Inter. J. Lib. Inf. Stu.*, 2013, **3**(1), 57-64.
9. Journal Citation Reports®. http://thomsonreuters.com/journal-citation-reports/ (accessed on 27 August 2014)
10. Thomson Reuters impact factor. http://wokinfo.com/essays/impact-factor/ (accessed on 27 August 2014)
11. Journal metrics. About SNIP. http://www.journalmetrics.com (accessed on 27 August 2014)
12. Journal metrics. About source normalised impact per paper (SNIP). http://www.journalmetrics.com/snip.php (accessed on 27 August 2014)
13. Hirsch, J.E. An index to quantify an individual's scientific research output. *In* Proceedings of the National Academy of Sciences of the United States of America, 2005, **102**(46), 16569–572.

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