

Scientometric Analysis of Chemistry Research Output in Selected Universities of Tamil Nadu



Library Science

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ABSTRACT

This paper presents a Scientometric analysis of the chemistry research publication productivity of the faculty of selected state universities in Tamil Nadu. Data has been downloaded from the web of science from 1989 to 2014. Among the 4033 publications in the span of 26 years, highest number of 417 papers was published in the year 2014. Dr .R. Ranganathan is the most productive author with 134 publications. Journal is the most sought form of publication with 3898 papers.

Introduction

Research is the primary function of a university. Qualitative research provides a pedestal to any university. Research in a university speaks of the fertile minds and an environment of intellectual interactions in the university. Scientific literature is expanding very fast. It is estimated that it doubles every five years. The research productivity of universities may vary depending on their nature and involvement in research activities. So, there is a need to examine university-wise research output of chemistry faculties in state universities of TamilNadu for the purpose of present empirical validation. Scientometrics are now used in quantitative research assessment exercises of academic output which is starting to threaten practice based research. This study evaluates publications productivity of chemistry faculty members of selected four state universities in Tamil Nadu, Viz. University of madras, Bharathithasan University, Bharathiar and Annamalai University.

Earlier studies

There are a large number of studies on bibliometrics and scientometrics covering various fields. A few studies which are relevant to the present work and presented below:

Amritpal and kaur (2010) analysed all the 269 publications of the department of chemistry, Gurunanak university from 84 journals. The findings showed that the number of publications increased consistently from 2002 to 2006. The department has published 45% of the papers at their own and 55% are published in collaboration with others departments and foreign institutions. Karki et al. (2009) investigated organize chemistry research activity during 1971-1989 using chemical abstracts. The authors identified an important-fact-that the activity index for the world and India in the field of organic chemistry was similar.

Objectives

The objectives of the studies includes:

To find out the year-wise research output of the faculty members from 1989 to 2014

To know the types of research output

To find out the most productive authors

To find out the research collaborations of faculty members with other countries

To identify the top ten journals

To find out the frequently used keywords by the faculty members.

Data Source and methods of Data Collection

The data used for the present study were obtained from the ISI web of science – Science Citation Index Expanded (SCIE). The whole data based on SCI for four universities of Tamil Nadu for the period 1989-2014 were retrieved during March 2015 and April 2015, which is available through UGC-INFONET Consortium at Annamalai university.

Analysis and Interpretation

Table 1

Year Wise Distribution of Research Output in Chemistry

Publication Year	Madras University	Bharathidasan University	Bharathiar University	Annamalai University	Total	%
1989	35	2	10	13	60	1.49
1990	21	1	5	13	40	0.99
1991	13	9	9	15	46	1.41
1992	31	11	12	11	65	1.61
1993	34	11	9	10	64	1.59
1994	24	13	25	18	80	1.98
1995	27	11	18	21	77	1.90
1996	33	19	17	25	94	2.33
1997	36	16	11	32	95	2.35
1998	26	17	13	33	89	2.21
1999	29	11	23	28	91	2.26
2000	26	17	22	20	85	2.11
2001	43	14	19	26	102	2.53
2002	39	15	47	30	131	3.25
2003	45	16	35	25	121	3.01
2004	54	12	59	44	169	4.19
2005	59	39	40	49	187	4.64
2006	70	43	33	58	204	5.05
2007	68	37	35	85	225	5.58
2008	57	30	25	69	181	4.49
2009	101	46	29	78	254	6.29

2010	76	41	37	79	233	5.78
2011	75	65	48	109	297	7.36
2012	76	51	70	91	288	7.14
2013	97	70	70	101	338	8.38
2014	120	96	101	100	417	10.34
TOTAL	1315	713	822	1183	4033	100.00
Percent-age	32.60%	17.69%	20.38%	29.33%	100%	

The annual research output of chemistry in selected universities of Tamil Nadu for the period between 1989 and 2014 has been presented in Table 1. The table indicates that the number of publication in 1989 was 60 that rose to 4033 in 2014. The highest output was observed in 2014 that accounts for percent of total output over the period of study.

Among the four universities the highest numbers of publications were published by University of Madras with 1315 records, contributing to 32.60% of the total publications, followed by Annamalai University with 1183 records, contributing to 29.33% of the total publications. Bharathiar University with 822 outputs, contributing to 20.38% of total publications and Bharathidasan University stands last by contributing only 17.69% of the total output with 713 publications.

Table 2
Distribution of Top ten Authors according to Number of Contribution

S. NO	Madras University		Bharathidasan University		Bharathiar university		Annamalai University	
	Author	Rec	Author	Rec	Author	Rec	Author	Rec
1	Raghunathan R	134	Palaniandavar M	118	Natarajan K	122	Karunakaran C	107
2	Rajakumar P	106	Venuvanalangam P	89	Prasad KJR	117	Swaminathan M	86
3	Ramamurthy P	78	Renganathan R	60	Kolandaivel P	104	Jayabharathi J	68
4	Kandaswamy M	70	Arunachalam S	44	Govindarajan S	56	Thanikachalam V	63
5	Narayanan V	69	Ramesh R	42	Mohan PS	54	Ramalingam K	57
6	Mohankrishnan AK	62	Muthiah PT	39	Mangalaraj D	41	Gopalakrishnan M	56
7	Ramakrishnan VT	55	Suresh E	39	Senthil Kumar K	41	Rajendiran N	54
8	Maruthamuthu P	51	Jeyaraman R	33	Karvembu R	37	Kabilan S	48
9	Narayanan SS	44	Muthusamy S	31	Rajendran SP	37	Manimekalai A	42
10	Natarajan P	40	Pillay MK	28	Selvasekara Pandian S	36	Meenakshisundaram S	40

Table 2 displays the contributions made by top ten authors in Chemistry research in selected University of Tamil Nadu. It is inferred from the table that University of Madras, Raghunathan R has published the maximum number of publications with 134 records, followed by Rajakumar P with 106 records. In Bharathidasan University, Palaniandavar M stands first with 118 records followed by Venuvanalangam P with 89 publications. In Bharathiar University, Natarajan K has published the maximum number of publications with 122 records, followed by Prasad KJR with 117 records publications. In Annamalai University, Karunakaran C has published the maximum number of publications with 107 records, followed by Swaminathan M with 86 records.

Table 3
Distribution of Collobration Countries

S.NO	Madras University		Bharathidasan University		Bharathiar university		Annamalai University	
	Country	Recs	Country	Recs	Country	Recs	Country	Recs
1	USA	17	Switzerland	38	USA	73	Italy	51
2	South Korea	16	USA	25	South Korea	39	Canada	24
3	Japan	15	Italy	15	Japan	25	Slovakia	14
4	Malaysia	12	Japan	14	France	15	South Korea	14
5	Germany	11	Saudi Arabia	13	UK	15	Turkey	13
6	Taiwan	10	UK	13	Canada	10	USA	13
7	France	7	South Korea	12	Germany	9	Finland	10
8	Portugal	6	Germany	9	Singapore	9	Japan	8
9	Singapore	5	Peoples R China	8	Australia	7	Malaysia	7
10	Spain	5	Canada	6	Taiwan	7	Oman	6

Table 3 depicts the extent of International collaboration on chemistry research by the selected universities of Tamil Nadu. It reveals the fact that University of Madras has the maximum collaborations with U.S.A and South Korea, contributing to 17 and 16 papers respectively. Bharathidasan University has collaborated often with Switzerland and U.S.A, contributing to 38 papers and 25 papers respectively. Bharathiar University has the collaborations with U.S.A and South Korea, contributing to 73 and 39 papers respectively. Whereas Annamalai University has often collaborated with Italy and Canada contributing to 51 and 24 papers respectively.

Table 5
Ranking of top three journals in selected Universities of Tamil Nadu

Institution	Journals	No.of papers
Madras university	Tetrahedron letters	105
	Synthetic communications	83
	Tetrahedron	57
Bharathidasan university	Indian journal of chemistry section b-organic chemistry including medicinal chemistry	34
	Rsc advances	33
	Tetrahedron letters	31
Bharathiar university	Indian journal of chemistry section b-organic chemistry including medicinal chemistry	65
	Rsc advances	34
	Synthesis and reactivity in inorganic and metal-organic chemistry	32
Annamalai university	Asian journal of chemistry	90
	Oxidation communications	64
	Journal of molecular structure	60

Table 5 indicates the journals in which chemistry faculty members of selected universities in Tamil Nadu preferred to publish their articles. Further, it is analysed to find out the key journals in the field of chemistry which here brought out with more number of publications made by faculty members. There have been 105 contributions published by a single journal 'Tetrahedron letters' it is ranked at the first position is taken by 'Asian journal of chemistry' which is accounted to 90 publications and the third position is taken by 'Synthetic Communications' which is accounted to 83 publications.

Table 6
Word Frequency

S.no	Madras university		Bharathidasan university		Bharathiar university		Annamalai university	
	Word	Recs	Word	Recs	Word	Recs	Word	Recs
1	Synthesis	528	Complexes	187	Synthesis	286	Synthesis	215
2	Novel	133	Synthesis	183	Complexes	158	Oxidation	189
3	Complexes	129	Copper	73	Ruthenium	77	Spectral	126
4	Electrochemical	112	Ligands	65	Properties	66	Acid	108
5	Characterization	110	Binding	58	Containing	62	Kinetics	99
6	New	106	Structure	58	Characterization	55	Substituted	83
7	Using	99	Dna	56	New	49	Effect	76
8	Cycloaddition	96	Ligand	55	Structure	46	Crystal	72
9	Reaction	94	Using	53	Activity	44	Aqueous	71
10	Properties	86	Activity	50	Carbazoles	44	Complexes	70

Table 6 explains the top 10 maximum usage of words by the faculty members of selected universities of Tamil Nadu. In University of Madras, the word "Synthesis" is mostly used by the researchers in 528 records which are followed by the word "Novel" in 133 records. The word "Complexes" was used maximum in 187 records by the faculty members in Bharathidasan University. In Annamalai University the faculty members used the word "Synthesis" in 215 records, followed by the word "Oxidation" in 189 records.

Findings

The findings of the present study are:

1. The growth of Chemistry literature increased in the year 2014.
2. The Journal articles occupy the predominant position compared to other sources.
3. Tetrahedron letters recording 105 publications was ranked at the first positions.
4. Raghunathan, R, University of Madras, is the most prolific author contributing 134 publications to chemistry disciplines.
5. Chemistry faculty preferred to publish their papers in collaboration with USA.

Conclusion

The scholarly contributions observed in chemistry literature contributed by faculty members of selected Universities in Tamil Nadu are collaborative in nature like any other discipline. The scenario of research trend in chemistry is expanding very fast not only in the home country, India but also intellectual ideas of chemistry faculty in Tamil Nadu. Spread beyond the country. It is strongly felt that this kind of Scenario is observed only because of the findings agencies like CSIR, UGC, etc whose prime motto is to promote the research and developmental activities in the academic area which in turn helps the government, policymakers, educators, etc to enhance the quality of education.

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