

PHD THESES ACCEPTED BY ALIGARH MUSLIM UNIVERSITY (AMU) IN THE DISCIPLINE OF CHEMISTRY: A BIBLIOMETRIC STUDY (1935-2014)

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A Bibliometric analysis of 809 theses accepted by the Department of Chemistry, Aligarh Muslim University, Aligarh (AMU) during 1935-2014 reveals that the number of theses accepted during the period of study has increased steadily. Highest number of theses was submitted during the five-year block of 1980-1984. Of the total 809 accepted theses, a 187 were submitted by female scholars. Highest number of theses submitted by women scholars was in the last two blocks of 2005-2009 and 2010-2014. Only, a miniscule number of theses were submitted under the supervision of female faculty. Highest number of theses was produced in the sub-discipline of organic chemistry. Only one women supervisor could find place among the list of 27 most prolific supervisors.

Keywords: Bibliometrics; Scientometrics; Aligarh Muslim University; PhD Theses

INTRODUCTION

A PhD thesis or dissertation is defined as a document submitted in support of candidature for an academic degree or professional qualification by presenting therein the author's research and findings. The quality of research of a thesis or dissertation can vary from country to country or from university to university, even from supervisor to supervisor. A PhD thesis represents the culmination of a student's knowledge and experience gained during his or her education. In order to be awarded a PhD, a scholar must be able to demonstrate mastery over a given subject. Research is considered to be the foundation for future investigation in any field and universities and research laboratories play a major role in it. Doctoral dissertations besides the publication in scholarly journals can be considered as parameters to assess the performance of the university or research laboratory in the field of investigation.

The Aligarh Muslim University, is one of the oldest universities in India established way back in 1920 by the Act of parliament. In the year 2014/15, A.M.U. has been awarded grade 'A' by the National Assessment and Accreditation Council (NAAC). The university offers post graduate, MPhil and doctoral level degree programmes in different disciplines [1]. The department of chemistry is one of the oldest departments in the university. Master's programme in chemistry started as early as 1911, when the University was just a College. As of now, the department conducts research and teaching in analytical, inorganic, organic and physical chemistry. Courses at postgraduate level in industrial chemistry [2] at the university were introduced in 1999-2000.

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AIM OF THE STUDY

Of the more than 100 departments of studies, Chemistry department is known worldwide for its research output. The present study, therefore, examines the performance of the research studies, conducted by the department of chemistry of Aligarh Muslim University (AMU) in terms of doctoral theses accepted during the period of 1935-2014.

PREVIOUS STUDIES

In the past, several bibliometric studies dealing with analysis of doctoral dissertations have been reported in literature. The same can basically be divided into two categories. First type of studies deal with the number of theses submitted to an institution or university, while the other type of studies deal with the nature of citations appended to the theses submitted in different disciplines. For instance, Pillai and Kumar [3] carried out an in-depth scientometric analysis on the doctoral dissertations submitted to the University of Kerala in the discipline of biochemistry during 1966-2015. The study showed that 168 doctoral degrees were awarded in biochemistry during the period of study. Maximum (25.6%) PhDs were awarded in the area of clinical biochemistry followed by metabolism (17.3%). In another study Suma and Pillai [4] analyzed 137 PhD theses submitted by the scientists of CSIR-NIIST, Thiruvananthapuram during 2001-2010 and found that majority of the theses (107) were in chemistry. The study also examined the number of references appended in these theses and found an average of 243 references per theses. Authors also identified the supervisors under whom maximum number of students were awarded PhD. Kumar [5] examined PhD theses submitted in the discipline of library and information science by different universities during the period of 1950-1997 and found that PhDs produced by different universities have increased significantly because universities are demanding a doctoral degree for library and information science faculty as well as for senior professionals in university and research institutions. Similar results were observed by Singh and Babbar [6] who too had examined theses submitted in the discipline of library and

information science by different universities during the period of 1950-2012. Nandi and Bandyopadhyay [7] examined the theses submitted in the department of Zoology of the Burdwan University and found that highest number of theses were submitted in the sub-discipline of entomology. Authors also identified supervisors who produced the highest number of theses. Singh, Bebi and Garg [8] made an analysis of the theses submitted to the University of Delhi in social sciences during 1995-2008 and found that the number of theses submitted has increased during the period of study. Authors also examined the documents cited and identified core journals in social sciences. In a recent study, Garg and Saini [9] made a bibliometric assessment of 1763 post-doctoral and Ph.D. dissertations submitted in the field of agricultural sciences by the scholars to Indira Gandhi Agricultural University (IGAU) during 1970-2010. The study found that the number of theses submitted increased steadily and reached a peak in the last block of 2006-2010. Most of the theses were submitted by male scholars and only 271 theses were submitted by female scholars. Also most of the supervisors were male. Highest number of theses were submitted in the department of agronomy followed by plant breeding and genetics.

OBJECTIVES

- To examine the pattern of growth of theses accepted during the period of 1935-2014 (80 years);
- To examine the distribution of theses accepted by gender of the scholars who submitted theses during the above period;
- To identify the most prolific guides and their gender; and
- To identify the sub-disciplines of chemistry in which these theses were accepted.

DATA SOURCE AND METHODOLOGY

The data source for the study was Shodhganga, a repository of Indian Electronic Theses and Dissertations. The repository has been set up by the INFLIBNET (Information and Library Network) centre located at Gandhi

Nagar (Gujarat), an autonomous centre of the University Grants Commission (UGC) of India. It provides a platform for research scholars to deposit their PhD theses in electronic version, so that it could be made available to the entire scholarly community in public domain. The repository has the ability to capture, index, store, disseminate and preserve ETDs (Electronic Theses and Dissertations) submitted by the researchers. Shodhganga replicates academic structure of each university in terms of Departments or Centres or Colleges to facilitate ease of navigation. It also facilitates research scholars from universities to deposit their theses in the respective Departments or Centres or Colleges. Shodhganga only provides the core discipline of the submitted theses and does not provide the sub-discipline of the submitted theses. The sub-disciplines of the theses accepted were identified by identifying the specialization of the supervisor as was available on the website of the chemistry department of AMU or from the title of the submitted theses. The gender of the supervisors was identified from their full names and also from the website of the chemistry department of AMU. Supervisors' Certificates provided in the theses were also used to ascertain the gender of the scholars/ supervisors.

RESULTS AND ANALYSIS

Chronological Distribution of Theses Submitted

As many as, 809 theses were accepted by the Department of Chemistry of AMU during the period of 1935 to 2014 (80 years). Thus, the average number of theses accepted per year was 10. Data presented in Table 1 in blocks of five years each indicates that the pattern of theses accepted by the university, follow an inconsistent trend. Further analysis of data indicates that during 1935-1959 (25 years) only 11 theses were accepted, less than even the average number of theses accepted per year. The number of theses accepted during this period is less, because in several years no theses were submitted. Only after 1959 the number of theses accepted has increased and it reached a peak with 126 theses during the block of 1980-

1984. A raw analysis of data on the yearly distribution of theses indicates that highest (32) number of theses were accepted in the year 1980. Other years in which more than 25 theses were accepted are: 1983, 1985, 1986, 2006, 2010 and 2013 and in the remaining years the numbers of theses submitted were less than 25. In years 1937-1941, 1943-1948, 1949-1952, 1955-1956 no theses were submitted.

Distribution of Theses by Gender of the Scholars

Data on the distribution of theses accepted by gender in blocks of five years has been depicted in Table 1. It indicates that during the period of 80 years, 622 (77%) of the accepted theses were submitted by male scholars and rest 23% (187) by female scholars. Further analysis of data indicates that the first three theses by women scholars were accepted in the years 1965 and 1967. The number of theses submitted and accepted by women scholars started increasing after that and reached a peak in the five-year block of 2005-2009 closely followed by the theses accepted in the last block. During the last two blocks about 40% of the accepted theses were of female scholars. This indicates an increasing interest of female scholars in science particularly chemistry. Highest number of theses by male scholars was produced in the year 1980, while highest number of theses by female scholars was submitted in the year 2013.

Distribution of Supervisors by Year and Gender

Table 2 presents the data on the distribution of supervisors by gender. It indicates that there was no women supervisor in the university in the first 65 years of the existence of the university and the women supervisors appeared only in the year 2000. Data presented in Table 2 indicates that during the total period of 80 years (1935 to 2014) 809 theses were awarded under the guidance of 158 supervisors, of which 151 were male supervisors and only seven were female supervisors. This indicates that most of the theses were awarded under the supervision of male supervisors. Data presented in Table 2 also indicates that, of the 809 theses, only a minuscule 29 (3.6%) number of theses were submitted under the female supervisors.

Table 1: Distribution of Theses in Block of Five Years and by Gender

Time Period	Theses Accepted of Male Scholars	Theses accepted of Female scholars	Total theses accepted
1935-1939	2	0	2
1940-1944	1	0	1
1945-1949	1	0	1
1950-1954	3	0	3
1955-1959	4	0	4
1960-1964	24	0	24
1965-1969	36	3 (7.7)	39
1970-1974	42	8 (16.0)	50
1975-1979	76	13 (14.6)	89
1980-1984	102	24 (19.1)	126
1985-1989	81	25 (23.6)	106
1990-1994	53	14 (20.9)	67
1995-1999	35	8 (18.6)	43
2000-2004	52	20 (27.8)	72
2005-2009	58	39 (40.2)	97
2010-2014	52	33 (38.8)	85
Total	622	187 (23.1)	809

Table 2: Distribution of Supervisors by Year and Gender

Year	Theses Accepted Under the Male Supervisors	Theses Accepted Under the Female Supervisors	Total
1935-1939	2	0	2
1940-1944	1	0	1
1945-1949	1	0	1
1950-1954	3	0	3
1955-1959	4	0	4
1960-1964	24	0	24
1965-1969	39	0	39
1970-1974	50	0	50
1975-1979	89	0	89
1980-1984	126	0	126
1985-1989	106	0	106
1990-1994	67	0	67
1995-1999	43	0	43
2000-2004	66	6	72
2005-2009	88	9	97
2010-2014	71	14	85
Total	780	29	809

Distribution of Supervisors by Number of Students Guided

As mentioned above, 158 supervisors guided 809 researcher scholars. Data on the number of students guided by a supervisor is presented in Table 3. It indicates that seven supervisors guided 20 or more scholars, 8 supervisors guided 15 or more scholars, and 14 supervisors guided 10 or more scholars and remaining supervisors guided less than 10 students. Thus 473 (58.5%) theses were awarded under the supervision of only 29 supervisors. Table 3 lists 29 supervisors who have guided 10 or more scholars in AMU during the period of study. The maximum numbers of theses (31) have been submitted under the guidance of Professor S M Osman followed by Professor Kabiruddin with 30 theses, Mohsin Qureshi with 25 theses, Syed Ashfaq Nabi and J P Rawat with 24 theses each. Only one female supervisor namely Arjmand Farukh could find place in the list of top 29 supervisors ranking at 15 in the list.

Table 3: Distribution of Supervisors by Number of Students Guided

S. No.	Name of Supervisors	No. of Student Guided	Rank	Gender
1	Osman S M	31	1	M
2	Kabiruddin	30	2	M
3	Qureshi Mohsin	25	3	M
4	Nabi Syed Ashfaq	24	4	M
5	Rawat J P	24	4	M
6	Shafiullah	22	5	M
7	Ahmad M S	20	6	M
8	Beg M A	18	7	M
9	Ilyas M	18	7	M
10	Islam Nurul	18	7	M
11	Qureshi Saidul Zafar	18	7	M
12	Rahman Nafisur	18	7	M
13	Rahman W	17	8	M
14	Siddiqi K S	16	9	M
15	Varshney K G	15	10	M
16	Shakir Mohammed	14	11	M
17	Zaidi Sayid Aftab Ahmad	14	11	M

18	Rafiuddin	13	12	M
19	Mushfiq M	12	13	M
20	Zaman Asif	12	13	M
21	Farooq M O	11	14	M
22	Khan Nizam U	11	14	M
23	Siddiqi Zaffar Ahmad	11	14	M
24	Tabassum Sartaj	11	14	M
25	Ahmad Naseer	10	15	M
26	Ansari W H	10	15	M
27	Arjmand Farukh	10	15	F
28	Malik Anees Uddin	10	15	M
29	Riyazuddeen	10	15	M

Distribution of Theses Submitted by Broad Sub-Disciplines

Shodhganga does not provide the sub-disciplines of the theses accepted. Sub-disciplines of the theses accepted were identified by the speciality of the supervisor available at the department of chemistry website of the AMU or from the title of the theses. Based on this analysis, the theses were classified into five sub-disciplines. These were organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry and applied chemistry. An analysis of data on the sub-disciplines of the theses accepted indicates that highest (371) theses were submitted in the sub-discipline of organic chemistry followed by physical chemistry (172) and inorganic chemistry (101). Thus about 80% theses were submitted in these three sub-disciplines, while the rest were submitted in other sub-disciplines of chemistry like analytical chemistry, applied chemistry and biochemistry.

CONCLUSION

- The present study analyzed 809 PhD theses accepted at the chemistry department of AMU during 1935-2014. It indicates that PhD theses submitted in the chemistry department of AMU was low in the beginning, but started increasing after 1960. Highest number of theses was accepted during 1980-1984. However, the pattern of

theses accepted during the period of study is inconsistent.

- The analysis of data indicates that no thesis was submitted in the years 1937-1941, 1943-1948, 1949-1952 and 1955-1956. The highest (32) PhD theses were submitted in the year 1980. Other years in which more than 25 theses were submitted are 1983, 1985, 1986, 2006, 2010 & 2013 and in the remaining years the numbers of theses submitted were less than 25.
- Of the total 809 theses accepted, 622 were by male scholars and 187 by female scholars. In the last 15 years the number of female scholars has gone up. Maximum numbers (30) of theses submitted by the male scholars were in the year of 1980, while those by female scholars, the maximum theses (14) were submitted in the year 2013.
- Of the 158 supervisors who produced 809 theses 150 were male and only eight were female supervisors. There was no women supervisor in the university in the first 60 years of the existence of the university and the women supervisors appeared only in 1999. Among the female supervisors Arjmand Farukh has guided highest number of PhD scholars, while amongst the male supervisors, S. M. Osman has guided highest number of PhD scholars followed by Kabiruddin and Mohin Qureshi.
- Highest number of theses was accepted in the sub-discipline of organic chemistry followed by physical chemistry. 56 sq. m. (600 sq. ft.) per one thousand. Figure 1 display that the largest are is occupied by district library with 3000 sq. ft. one town library has covers around 1650 sq. ft. area and another two is 1208/770 sq. ft. area in the respective town like Beldanga, Lalgola and Kandi. Two sub-divisional libraries have covered 850 and 1800 sq. ft. in two sub-divisional area like Lalbagh and Kandi sub-division. Apart from this, it is also observed that most of the rural libraries have average 500-900 sq. ft. Only 1 rural library has covered 180 sq. ft. area. It shows that except three libraries like Ramendra Sundar Smriti Pathagar Shahar Granthagar, Murshidabad District Library and Raghunath Club Govt. Sponsd. Rural Library, all public libraries in Murshidabad district have followed the UNESCO Guidelines 2001.

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