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Global Scenario of *Sesame indicum* L. Research Productivity - a Study based on Science Citation Index

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Abstract

Analysis of the scholarly research output of researchers in the field of sesame research productivity web, the research papers published by the scholars in the field of Sesame covered in the annual version of Science Citation Index database were taken as the prime source for the present study. This paper attempts to highlight quantitatively the growth and development of world literature on Sesame research in terms of publication output as per Science Citation Index (1971 - 2010). During 1971 - 2010 a total of 480 papers were published by the scientists in the filed of Sesame research. Year wise publication, Authorship wise productivity, Journal wise publication, Institution wise research productivity, Publication document type, Language wise publication and Country wise publication are examined to identify the pattern of research contribution in the field of Sesame research productivity. Subject wise research performance in analysed to identify core area of research and the trend of subjects. Further, an attempt is made to measure the performance of researchers and their research concentration in the field of Sesame research. This article is mainly identifying research output on Sesame research productivity.

Keywords: Author, Research Productivity, Science Citation Index, Sesame, Web of Science.

Introduction

Sesame (*Sesamum indicum* L.) is a flowering plant in the genus *Sesamum*. Numerous wild relatives occur in Africa and a smaller number in India. It is widely naturalized in tropical regions around the world and is cultivated for its edible seeds, which grow in pods. The flowers of the sesame seed plant are yellow, though they can vary in colour with some being blue or purple. Sesame is an ancient oilseed, first recorded as a crop in Babylon and Assyria over 4000 years ago. The crop has since spread from the Fertile Crescent of the Ancient Near East to be grown in many parts of the world on over 5 million acres (http://www.jeffersoninstitute.org). Despite the fact that the majority of the wild species of the genus *Sesamum* are native to sub-saharan Africa, Bedigian demonstrated that sesame was first domesticated in India, citing morphological and cytogenetic affinities between domesticated sesame and the south Indian native *S. mulayanum* Nair., as well as archeological evidence that it was cultivated at Harappa in the Indus Valley between 2250 and 1750 BC, and a more recent find of charred sesame seeds in Miri Qalat and Shahi Tump in the Makran region of Pakistan (http://en.wikipedia.org).

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Sesame, *Sesamum indicum* L. (Family Pedaliaceae) is an annual herb native to the tropics and it is cultivated in tropical and subtropical crop for its seeds that are rich in oil and protein (Beatrice et al. 2006). It is considered to be a highly valuable oilseed crop throughout the world, and sesame seed oil is used for both dietary and therapeutic applications. Sesame seed oil is unique among the commercially available edible oils obtained from oil-seed crops in being very stable at room temperature as well as having a high percentage of desirable mono- and poly-unsaturated fatty acids and natural antioxidants such as sesamin, sesamolin, and sesamol. The report biotechnological techniques coupled with classical breeding methodology have a great potential for effecting genetic improvement of *S. indicum.*

Objectives of the Study

The main objective of the study is to present the growth of world literature on Sesame research and make the quantitative assessment of status of the research way of analysing the following features of research output.

- To find out year wise growth of publication on Sesame research productivity (1971 - 2010).
- To identify the Author wise research productivity (Top 30).
- To identify the Journal wise publication (Top 30).

- To analyze the Institution wise research productivity (Top 30).
- To assess the Document types used by the researcher.
- To identify the Language wise distribution of publications.
- To assess the Country wise research publication (Top 10).
- To analyze the Subject wise research productivity.

Materials and Methods

The publications of Sesame research is mostly in the form of Primary Journals, Note, Reviews, Meeting abstract, Proceedings paper and Correction. The research papers published by Researchers in the field of Sesame research covered in the annual version of Science Citation Index (SCI) database were taken as the prime source for the present study. The papers published from 1971 to 2010 by the researchers are accounted totally 480 papers. They were retrieved from SCI (Web of Science) database, which is considered to be a prime source of data for the present study. The bibliographical details of publications were entered in the catalogue cards. Finally the cards were arranged in different ways with a view to identify the research performance on Sesame research productivity.

Results and Discussion

1. Year wise Sesame Research Publication

Table 1 could clearly see that during the period 1971 - 2010 a total of 480 publications were published at International Level. The highest publication is 39 in 2009 and 2010 with 31 and 3 Global Citation Scores (GCS : 8.1 %) were recorded respectively. Thirty three papers in 2008 with 48 Global Citation Scores (6.8 %) and 30 papers in 2007 with 129 Global Citation Scores (6.2 %) were recorded. The lowest publication is 1 in 1976, 1979 and 1987 with 1, 2 and 1 Global Citation Scores (0.2 %) were recorded respectively (Table 1; Fig. 1). The study was also recorded all these 480 publications have 2386 Global Citation Scores and 479 Local Citation Scores citied references showed that there is a healthy trend in citing reference is found in Sesame Research globally.

2. Author wise Sesame Research Productivity (Top 30)

Table 2 indicates ranking of top 30 authors by number of publications. Author Prakash, V is published highest number of articles for the study period with 24 records (5.0 %). Prakash, V having highest global citation score of 251 with 24 publications and followed by author Tzen, J.T.C is having 180 global citation score with 4 publications (0.8 %) (Table 2). Thus the most-cited authors are distinguished from the most-published ones. It is found from the analysis that Lotka's law may not be applicable with regard to author productivity in proliferation of research is Sesame research as the research papers equally distributed by a large number of authors.

3. Journal wise Sesame Research Publication (Top 30)

Table 3 indicates ranking of top 30 journals by number of publications. Indian Journal of Agronomy are published highest number of articles of the study period with 57 records and global citation score of 50 followed by Indian Journal of Agricultural Sciences are published 36 articles with 24 global citation scores. Journal of Agricultural and Food Chemistry are published 18 (3.8 %) but 222 global citation scores recorded (Table 3).

4. Institution wise Sesame Research Productivity (Top 30)

Table 4 indicates top 30 Institutions produced by Sesame research articles. Central Food Technological Research Institute, Mysore, India is published highest number of articles of the study period with 22 records (4.5 %) and global citation scores 228 followed by Tamilnadu Agricultural University, Coimbatore, India is published 14 (2.9 %) articles with 10 global citation scores (Table 4).

5. Source wise distribution of Sesame research productivity

The study reveals that the major source of publications covered by web of science on Sesame research in Journal Article 442 with 2169 global citation scores (92.1 %) followed by Note 19 (4.0 %) with 40 global citation scores (Table 5; Fig. 2).

6. Language wise distribution of Sesame research publications

The table 6 shows the language-wise distribution of Sesame research productivity. It clearly reveals that 459 (95.6 %) of the research publications are in English language, while 9 (1.9 %) articles in Portuguese and Spanish languages, in French language 2 (0.4 %) and German language 1 (0.2 %) article are published (Table 6; Fig. 3).

7. Country wise Sesame research productivity (Top 10)

The table 7 indicated that among the top 10 country wise Sesame research literature covered by the study India tops with 212 articles which is followed by United States of America with 37 publications, while Japan 32, with Turkey with 27, South Korea with 25, Brazil with 17, Nigeria with 15, Venezuela with 14, Peoples R China with 12 and Sweden with 12 research publication respectively. India is number one among the top 10 countries in terms of the Sesame research literature and positioned at 1st rank with 212 articles published with highest global citation scores 652. USA obtained 2nd rank with 37 articles published with 503 global citation scores. Japan secured 3rd rank in terms of global citation scores with 270 with only 32 research

publications (Table 7; Fig. 4). It seems that there is no significant relation with number of articles and citation scores among the countries produced Sesame research literature.

8. Subject wise research productivity

Table 8 could clearly showed that during the period 1971 - 2010 a total of 480 publications 145 (30.2 %) articles published in Agronomy subject area (Table 8; Fig. 5).

Conclusion

The scientific study on sesame research productivity web based on science citation index date base exhibits that India is the main produce of scientific outputs. The sesame productivity web is becoming advantages for the World Wide Web, it is essential to analysis the research literature in sesame by various subject areas, institutions, countries and contribution of authors.

Tables and Figures

Table I. Year wise growth of publication on Sesame research productivity (1971 - 2010)

S. No.	Publication Year	Records	Percentage	TLCS (Total Local Citation Score)	TGCS (Total Global Citation Score)
1	1971	2	0.4	0	16
2	1972	2	0.4	2	15
3	1973	2	0.4	1	4
4	1974	4	0.8	2	49
5	1975	2	0.4	0	60
6	1976	1	0.2	0	1
7	1977	2	0.4	21	50
8	1978	2	0.4	25	39
9	1979	1	0.2	0	2
10	1980	5	1.0	14	40
11	1981	9	1.9	5	67
12	1982	3	0.6	13	35
13	1983	9	1.9	9	7
14	1984	4	0.8	1	6
15	1985	7	1.4	15	31
16	1986	2	0.4	8	24
17	1987	1	0.2	0	1
18	1988	7	1.4	14	51
19	1989	4	0.8	3	6
20	1990	8	1.7	11	39
21	1991	19	3.9	9	100
22	1992	16	3.3	19	82
23	1993	15	3.1	6	162
24	1994	15	3.1	15	88
25	1995	19	3.9	11	82

26	1996	11	2.3	13	30
27	1997	15	3.1	17	145
28	1998	18	3.7	19	82
29	1999	14	2.9	21	49
30	2000	18	3.7	11	104
31	2001	19	3.9	28	131
32	2002	12	2.5	29	115
33	2003	17	3.5	29	87
34	2004	21	4.3	21	130
35	2005	11	2.3	9	70
36	2006	22	4.6	30	175
37	2007	30	6.2	28	129
38	2008	33	6.8	9	48
39	2009	39	8.1	10	31
40	2010	39	8.1	1	3

Figure 1. Year wise growth of publication (1971 - 2010)

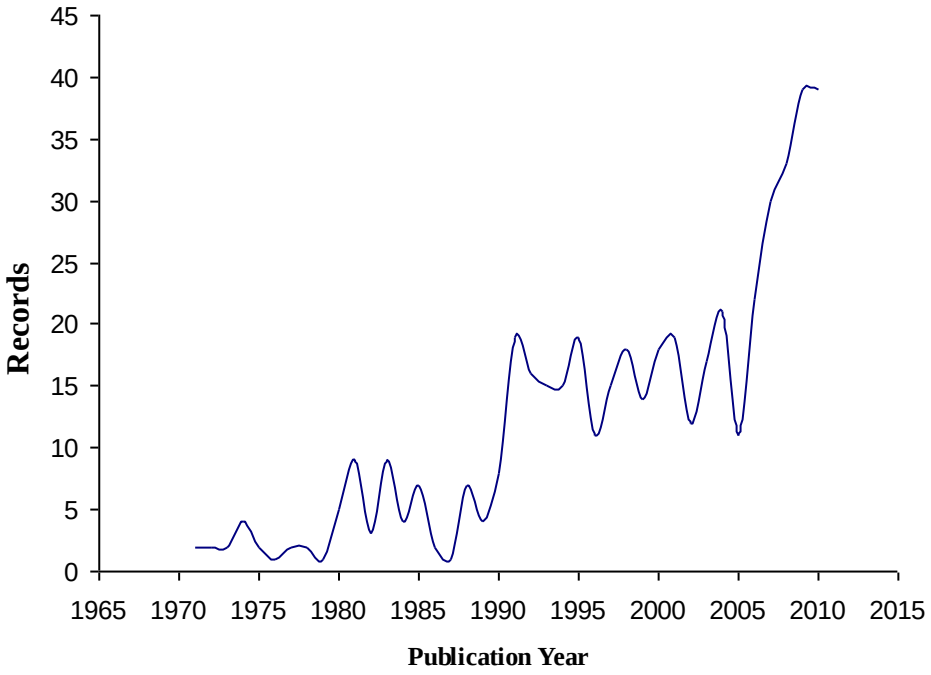


Table II. Author wise Sesame research productivity (Top 30)

S. No.	Author	Records	Percentage	TLCS	TGCS
1	Prakash, V	24	5.0	104	251
2	Cagirgan, M.I	11	2.3	32	41
3	Uzun, B	10	2.0	38	51
4	Singh, R.P	9	1.8	15	105
5	Nandi, P.K	7	1.4	67	140
6	Sarkar, R.K	7	1.4	2	5
7	Chung, C.H	6	1.2	8	50
8	Katsuta, M	6	1.2	9	46
9	Kim, K.S	6	1.2	3	21
10	Chakraborty, A	5	1.0	5	7
11	Laurentin, H	5	1.0	6	18
12	Lee, J.W	5	1.0	4	41
13	Lee, S.W	5	1.0	11	40
14	Mondal, S.S	5	1.0	2	8
15	Park, S.H	5	1.0	3	20
16	Rajendran, S	5	1.0	7	25
17	Sarma, N.N	5	1.0	0	1
18	Yi, Y.B	5	1.0	4	41
19	Carlsson, A.S	4	0.8	8	14
20	Chatterjee, B.N	4	0.8	1	7
21	Chun, J.A	4	0.8	3	26
22	Furat, S	4	0.8	6	6
23	Ghosh, S	4	0.8	4	17
24	Grichar, W.J	4	0.8	2	4
25	Inamori, Y	4	0.8	1	30
26	Mitsunaga, T	4	0.8	6	26
27	Sarma, D	4	0.8	0	1
28	Tsujibo, H	4	0.8	1	30
29	Tzen, J.T.C	4	0.8	5	180
30	Yoshida, H	4	0.8	2	35

Table III. Journal wise Sesame research publication (Top 30)

S. No.	Journal	Records	Percentage	TLCS	TGCS
1	Indian Journal of Agronomy	57	11.8	23	50
2	Indian Journal of Agricultural Sciences	36	7.5	4	24
3	Journal of Agricultural and Food Chemistry	18	3.8	56	222
4	Journal of the American Oil Chemists Society	13	2.7	39	119
5	Current Science	9	1.8	0	6
6	Genetic Resources and Crop Evolution	8	1.6	26	57
7	Tropical Agriculture	8	1.6	2	4
8	Food Chemistry	7	1.4	13	60
9	Crop Protection	6	1.2	2	18
10	Field Crops Research	6	1.2	23	41
11	Indian Journal of Biochemistry & Biophysics	6	1.2	8	19
12	Indian Journal of Experimental Biology	6	1.2	1	19
13	African Journal of Biotechnology	5	1.0	3	6
14	Bioscience Biotechnology and Biochemistry	5	1.0	7	34
15	Euphytica	5	1.0	30	45
16	Journal of Agronomy and Crop Science-Zeitschrift Fur Acker und Pflanzenbau	5	1.0	9	10
17	Journal of the Science of Food and Agriculture	5	1.0	7	96
18	Plant Production Science	5	1.0	2	3
19	Chemosphere	4	0.8	4	96
20	Communications in Soil Science and Plant Analysis	4	0.8	1	9
21	Indian Journal of Genetics and Plant Breeding	4	0.8	0	0
22	International Journal of Peptide and Protein Research	4	0.8	34	88
23	Journal of Food Science	4	0.8	1	49
24	Journal of Food Science and Technology-Mysore	4	0.8	0	8
25	Plant Breeding	4	0.8	17	30
26	Acta Physiologiae Plantarum	3	0.6	0	0
27	Allelopathy Journal	3	0.6	0	16
28	Animal Nutrition and Feed Technology	3	0.6	0	0
29	Annals of Arid Zone	3	0.6	1	5
30	Archivos Latinoamericanos De Nutricion	3	0.6	0	1

Table IV. Institution wise Sesame Research Productivity (Top 30)

S. No.	Institution	Records	Percentage	TLCS	TGCS
1	Cent Food Technol Res Inst	22	4.5	97	228
2	Tamil Nadu Agr Univ	14	2.9	7	10
3	Swedish Univ Agr Sci	10	2.0	24	99
4	Bidhan Chandra Krishi Viswavidyalaya	8	1.6	7	18
5	Akdeniz Univ	7	1.4	42	64
6	Andhra Pradesh Agr Univ	7	1.4	2	6
7	Univ Calcutta	7	1.7	6	21
8	Assam Agr Univ	6	1.2	0	1
9	Dong A Univ	6	1.2	8	50
10	Maharshi Dayanand Univ	6	1.2	15	105
11	Rajasthan Agr Univ	5	1.0	0	0
12	Univ Centroccidental Lisandro Alvarado	5	1.0	6	25
13	Univ Florida	5	1.0	3	27
14	Andhra Univ	4	0.8	0	3
15	Bhabha Atom Res Ctr	4	0.8	0	4
16	Bidhan Chandra Agr Univ	4	0.8	2	5
17	Cent Agr Res Inst	4	0.8	4	16
18	Kinki Univ	4	0.8	6	26
19	Natl Inst Crop Sci	4	0.8	2	3
20	Rajendra Agr Univ	4	0.8	2	4
21	Univ Agr	4	0.8	2	9
22	Akdeniz Univ	4	0.8	1	2
23	Ege Univ	3	0.6	1	28
24	Jinju Natl Univ	3	0.6	0	20
25	King Saud Univ	3	0.6	7	16
26	Kobe Gakuin Univ	3	0.6	2	34
27	Marathwada Agr Univ	3	0.6	3	4
28	Natl Bot Res Inst	3	0.6	4	96
29	Natl Inst Agr Biotechnol	3	0.6	2	20
30	Osaka Univ Pharmaceut Sci	3	0.6	1	26

Table V. Source Wise Distribution of Sesame Research Publications

S. No.	Document Type	Records	Percentage	TLCS	TGCS
1	Article	443	92.3	470	2169
2	Note	19	4.0	5	40
3	Review	8	1.7	3	165
4	Meeting Abstract	5	1.0	0	0
5	Proceedings Paper	5	1.0	1	12

Figure 2. Source Wise Distribution of Sesame Research Publications

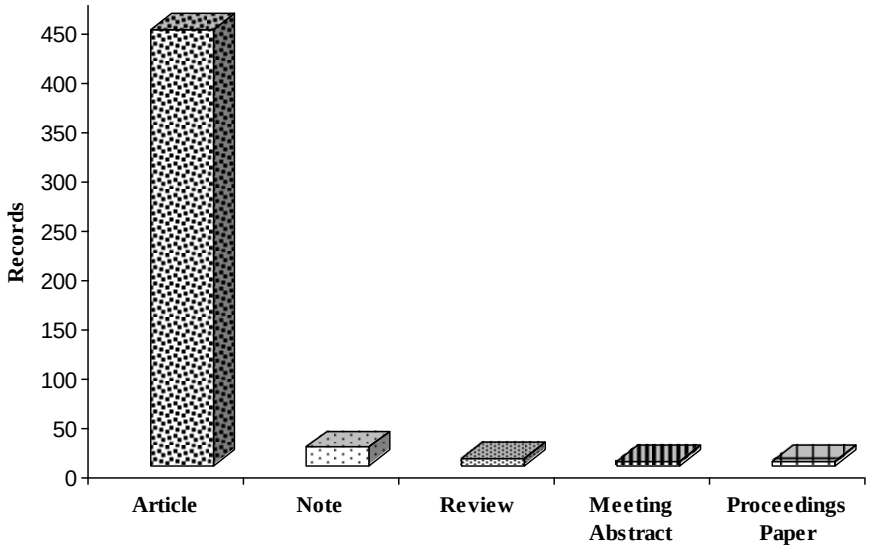


Table VI. Language wise distribution of research publication

S. No.	Language	Records	Percentage	TLCS	TGCS
1	English	459	95.6	475	2373
2	Portuguese	9	1.9	3	9
3	Spanish	9	1.9	1	3
4	French	2	0.4	0	1
5	German	1	0.2	0	0

Figure 3. Language wise distribution of Sesame Research Publication

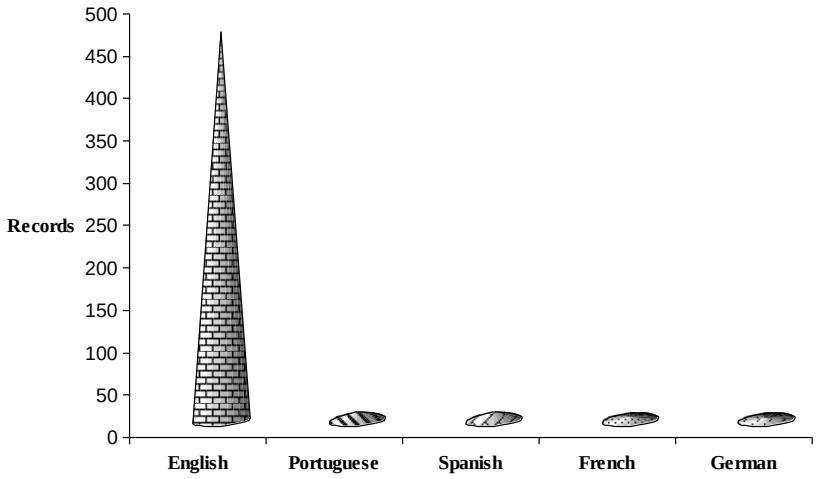


Table VII. Country wire Sesame research productivity (Top 10)

S. No.	Country	Records	TLCS	TGCS
1	India	212	197	652
2	USA	37	49	503
3	Japan	32	45	270
4	Turkey	27	58	134
5	South Korea	25	25	140
6	Brazil	17	4	44
7	Nigeria	15	6	31
8	Venezuela	14	6	33
9	Peoples R China	12	8	44
10	Sweden	12	25	102

Figure 4. Country wire Sesame research productivity

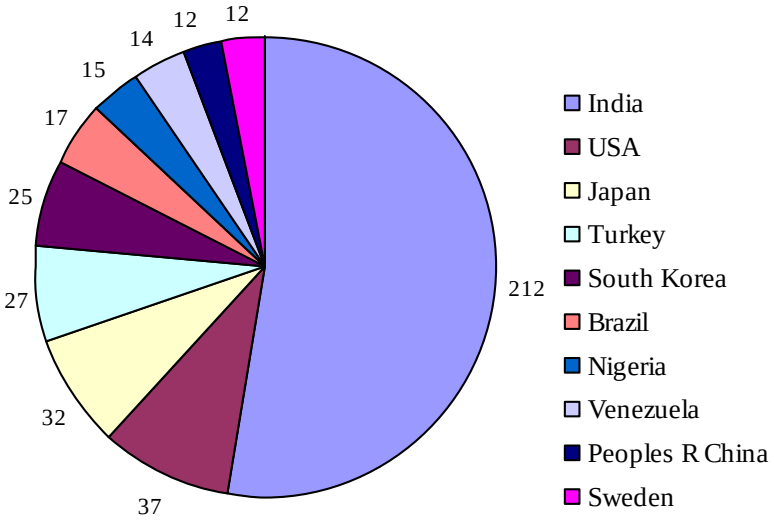
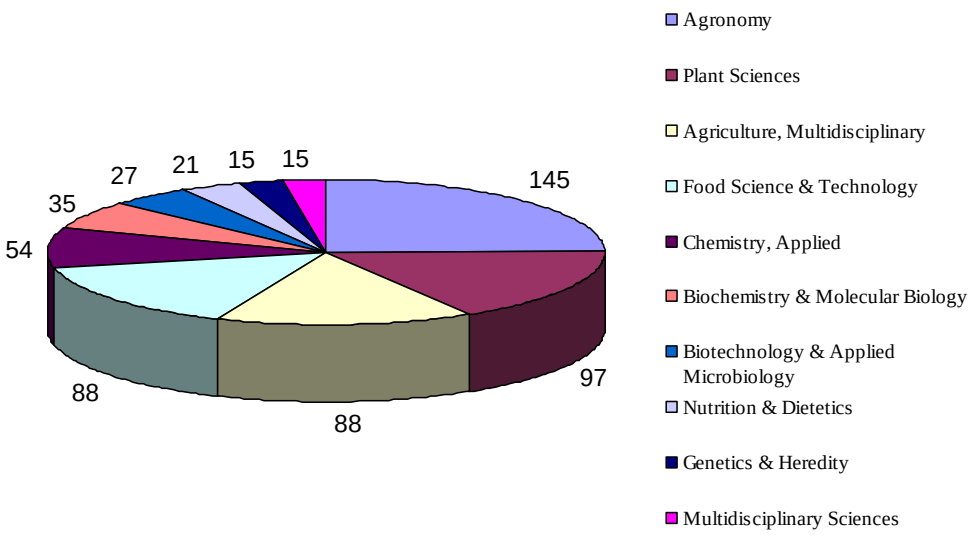


Table VIII. Subject wise publication

S. No.	Subject Area	Record Count	% of 480
1	Agronomy	145	30.2083 %
2	Plant Sciences	97	20.2083 %
3	Agriculture, Multidisciplinary	88	18.3333 %
4	Food Science & Technology	88	18.3333 %
5	Chemistry, Applied	54	11.2500 %
6	Biochemistry & Molecular Biology	35	7.2917 %
7	Biotechnology & Applied Microbiology	27	5.6250 %
8	Nutrition & Dietetics	21	4.3750 %
9	Genetics & Heredity	15	3.1250 %
10	Multidisciplinary Sciences	15	3.1250 %

Figure 5. Subject wise research productivity (%)



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