SCIENTOMETRIC ANALYSIS OF THE JOURNAL "NATURE BIOTECHNOLOGY"

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Abstract: *- The Study is to analyze the Journal "Nature Biotechnology" Scientometric analysis during 1989 - 2017. The study covers 29 years. The study mainly focused the Year wise publication of Articles, Authorship pattern, Type of document, Growth Ratio, Relative Growth Rate and Country wise Publication of articles. This paper critically analyses 9874 scholarly communications published in the Nature Biotechnology Journal. The maximum articles 568 were published in the year 1999 and the minimum 46 in the year 1995. In the authorship pattern, the maximum articles 5131 were published by single author. The RGR in the starting year 1990 is 0.78 and 0.03 in the last year 2017. The Doubling time in the starting year 1990 was 0.88 and in the last year 2017 was 27.47.*

Keywords : Scientometric, Nature Biotechnology, Authorship pattern, Growth Ratio, Document Type

1. Introduction

According to Alan Pritchard bibliometrics as "the application of mathematics and statistical methods to books and other media of communication". All the studies concentrate towards the merits and demerits of the research publications which will be helpful for its further development. This paper studies the Scientometric analysis of the literature published in the Nature Biotechnology from 1989 to 2017. Nature Biotechnology is a peer reviewed monthly journal published by the Nature Publishing Group. The subject biotechnology is the main focus of the journal that includes research results also. Moreover the Journal focusing the related subjects such as biomedical, biological, agricultural and environmental sciences. The Journal continues serial publication under the title "Bio/Technology", which had a publication period of 1983 to 1996. The latest impact factor of the journal is 41.667 based on the Thomson Reuters' Journal Citation Reports (JCR).

2. Review of Literature

Baskaran, C. (2013)[1] conducted a study on the Research productivity of Alagappa University during 1999-2011. The Relative

growth rate was floating in this study. The doubling time was increased and decreased trend in this study. Baskaran, C & Sivakami, N. (2014)[2] made a Study on Swine influenza research output. A total of 2360 articles were taken using the search term " Swine" from the Pubmed database. The study consists of publication frequency, country, and institution wise productivity. Results and Findings show that majority of the scientists wished to publish research papers in multiple authorship. Baskaran, C. (2013)[3] conducted a study on the Research growth trend and author collaboration of Alagappa University in India during 1999-2011, The study consists of the authorship Pattern, subject-wise and institution-wise collaboration. The Degree of collaboration and its means value is found to be 0.963. Baskaran,C & Karuilancheran,C. (2015)[4] conducted a Scientometric study in Diabetes and Allied Diseases in India During 1995–2013.In this study, the calculated values of Maximum Likelihood Estimator, n and k are 0.24, 2.66 and 0.78 respectively. The calculated value of Chi-Square (X 2) obtained in this case is 5309.368. Gupta, B.M., and Kaur, H. (2013)[5] conducted a study on the global research output in glaucoma research during 2002 to 2011. A total of 33098 papers were published. In country wise distribution, USA tops the list with 27.25% followed by China (8.60%), UK (8.09%) and India ranks 6th with 3.26%. Findings show that the annual average growth rate is 6.94%. Muthukrishnan, R., and Srinivasaragavan, S. (2013)[6] analyzed the Indian Research output on global warming from Science citation Index (SCI) during 1999 to 2012. A total of 1164 articles were published with an average publication per year 83.14. The majority of the articles 273 were published in the year 2011. Among the authors, H. Pathak has contributed the highest 24 publications of 6.92%. Prasanna Kumari, N., Amsaveni, N., and Surulinathi, M. (2015)[7] have analysed the global level perspective of Occupational Therapy research output during the period of 1989 to 2015. The data were taken from the Web of Science database. 8095 publications were retrieved. This study reveals that the highest number of records has found to be at 2013. University of Queensland tops first in the ranking followed by the University of Toronto. In the country wise distribution, the United States of America tops first in the ranking and India holds the 25th position in the global ranking. Teli, S., and Maity, A (2015)[8] have analyzed the growth pattern of Higgs Boson literature during 2005-2014. The data were taken form Scopus Database. A total of 4359 records contributed worldwide. The distribution of publications based on the year of production, country wise productivity, document type of the publications, Major subject categories , authors whose contribution is in the maximum level were studied. The research in this field is infantile stage in India. Tripathi, H.K., Sharma, J., and Garg, K.C. (2015)[9] analyzed publication output of India on cereal crops reflected by its coverage in Indian Science Abstracts (ISA) and CAB Abstracts during 1965-2010. Findings show that highest number of

papers (43.80%) were published on rice, followed by wheat (24.28%). The highest numbers of papers were published in Indian Journal of Agricultural Science.

Objectives of the Study

The Main purpose of the study is to analyze Year wise publication of Articles, Authorship pattern, Document Type and its count, Growth Ratio, Relative Growth Rate, Doubling Time and Country wise distribution of articles in the Journal "Nature Biotechnology" from 1989 to 2017.

Methodology

Scopus Database was used to retrieve the data from the Journal "Nature Biotechnology". Articles published from 1989-2017 were analyzed. The study covers 29 years. The collected data has been analyzed with Open Office Spreadsheet and given in the form of Tables and charts in order to find the Year wise distribution of articles, Authorship Pattern, Growth Ratio, Relative Growth Rate, Doubling Time, and Degree of collaboration and Country wise distribution of articles.

4. Analysis and discussion

4.1 Year wise Distribution of Articles

Table 1 shows The Journal "Nature Biotechnology" published 9874 articles from the period of 1989 to 2017 with an average of 340.48 per year. It is observed that majority of the articles 568 were published in the year of 1999. It is found that very less number of articles 46 were published in the year of 1995. The fig.1 clearly shows that a sudden upward growth of articles in the journal in the year 1996. After the year 2010, we can see a slight downward in the growth of articles until the year 2017 in the Journal " Nature Biotechnology".

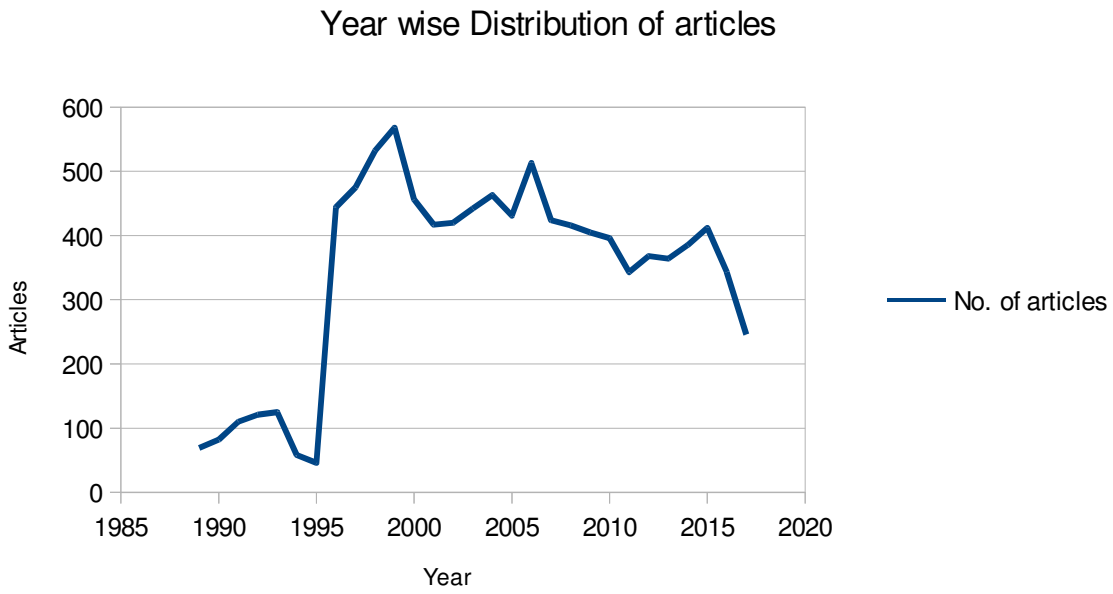

Fig.1: Year wise Distribution of articles

Year	No. of articles	Percentage	Cumulative	Cumulative %
1989	69	0.70	69	0.70
1990	82	0.83	151	1.53
1991	110	1.11	261	2.64
1992	121	1.23	382	3.87
1993	125	1.27	507	5.13
1994	58	0.59	565	5.72
1995	46	0.47	611	6.19
1996	444	4.50	1055	10.68
1997	475	4.81	1530	15.50
1998	532	5.39	2062	20.88
1999	568	5.75	2630	26.64
2000	456	4.62	3086	31.25
2001	417	4.22	3503	35.48
2002	420	4.25	3923	39.73
2003	442	4.48	4365	44.21
2004	463	4.69	4828	48.90
2005	431	4.36	5259	53.26
2006	513	5.20	5772	58.46
2007	424	4.29	6196	62.75
2008	416	4.21	6612	66.96
2009	405	4.10	7017	71.07
2010	396	4.01	7413	75.08
2011	343	3.47	7756	78.55
2012	368	3.73	8124	82.28
2013	364	3.69	8488	85.96
2014	385	3.90	8873	89.86
2015	412	4.17	9285	94.03
2016	343	3.47	9628	97.51
2017	246	2.49	9874	100.00
Total	9874	100.00		

Table.1: Year wise distribution of Articles

4.2 Authorship Pattern

Table 2 found that there are 9874 authorship observed for contributed in Journal of "Nature Biotechnology" from 1989 to 2017. Articles written by single author 5131 (51.96%) are found to be predominant followed by two authors 1348 (13.65%), three authors 662 (6.70 %) and four authors 466 (4.72 %) etc.

Table 2– Authorship pattern analyzed in the Nature Biotechnology

No. of authors	No. of articles	Percentage	Cumulative	Cumulative %
1	5131	51.96	5131	51.96
2	1348	13.65	6479	65.62
3	662	6.70	7141	72.32
4	466	4.72	7607	77.04
5	414	4.19	8021	81.23
6	314	3.18	8335	84.41
7	256	2.59	8591	87.01
8	221	2.24	8812	89.24
9	162	1.64	8974	90.89
10 <	900	9.11	9874	100.00
Total	9874	100.00		

4.3 Types of Document

Table 3 shows , regarding the Types of papers published in the Nature Biotechnology, the highest contribution was from article 4349 (44.04%) followed by Note 1987 (20.12%) and Short Survey 1168 (11.83%). The lowest contribution was from retracted article 1 (0.01) and Conference Paper 6 (0.06).

Table 3 – Types of articles published in the Nature Biotechnology

Document Type	Count	Percentage	Cumulative	Cumulative %
Article	4349	44.04	4349	44.04
Conference Paper	6	0.06	4355	44.11
Editorial	439	4.45	4794	48.55
Erratum	391	3.96	5185	52.51
Letter	988	10.01	6173	62.52
Note	1987	20.12	8160	82.64
Retracted	1	0.01	8161	82.65
Review	545	5.52	8706	88.17
Short Survey	1168	11.83	9874	100.00
Total	9874	100.00		

4.4 Growth Ratio by Year-wise

Table 4 is observed, the growth ratio of articles published in the Journal "Nature Biotechnology" shown in the table 5. The Growth ratio changes from 0.79 to 9.65. Figure 2 shows the fluctuation in the Growth ratio. The sudden change in the growth is clearly shown in the Figure 2.

Fig.2: Year wise Growth Ratio

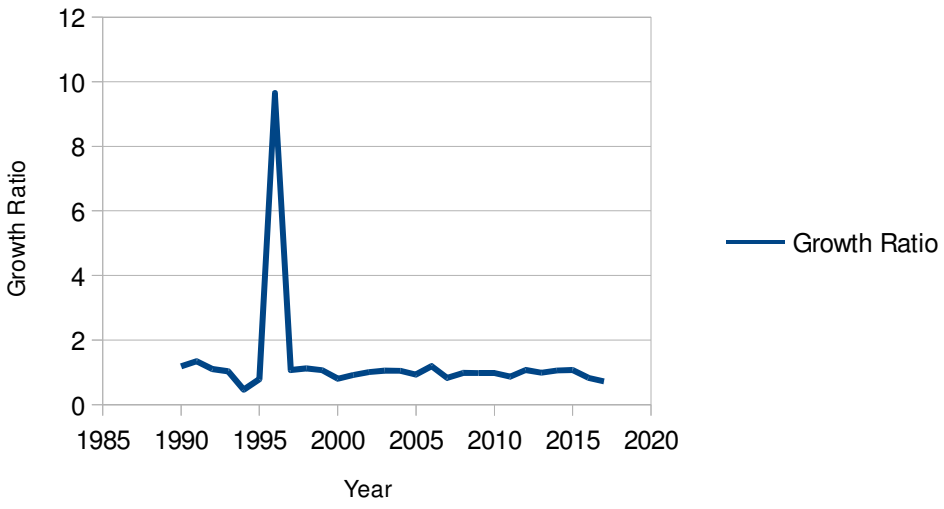

Table.4: Year wise Growth Ratio

Year	No. of articles	Growth Ratio
1989	69	
1990	82	1.19
1991	110	1.34
1992	121	1.10
1993	125	1.03
1994	58	0.46
1995	46	0.79
1996	444	9.65
1997	475	1.07
1998	532	1.12
1999	568	1.07
2000	456	0.80
2001	417	0.91
2002	420	1.01
2003	442	1.05
2004	463	1.05
2005	431	0.93
2006	513	1.19
2007	424	0.83
2008	416	0.98
2009	405	0.97
2010	396	0.98
2011	343	0.87
2012	368	1.07
2013	364	0.99
2014	385	1.06
2015	412	1.07
2016	343	0.83
2017	246	0.72
Total	9874	

4.5 Relative Growth Rate (RGR) and Doubling Time (DT) of Year-wise Publications

Table 5 found that the rate of growth of articles published in the Journal "Nature Biotechnology" is ascertained by calculating relative growth rates and doubling time for publications. The RGR from the year 1990 is 0.78, the final year 2017 is 0.03, and the overall value is 0.18. The values are decreased year by year . At the same time, the Doubling Time (DT) shows increasing trend, from the year 1990 is 0.88 and the final year 2017 is 27.47.

Fig.3: Doubling Time

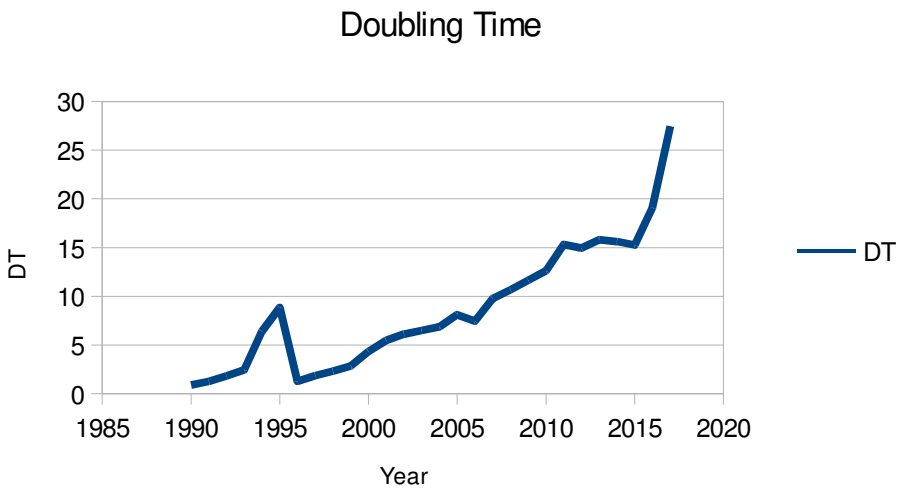

Fig.4: Relative Growth Rate

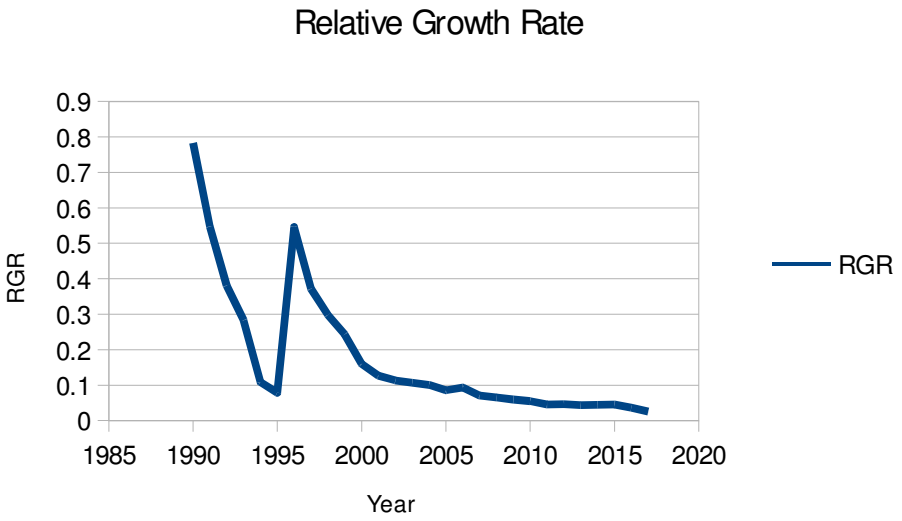

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Table.5: Relative Growth Rate and Doubling Time of Year-wise Publications

Year	No. of articles	Cumulative	W1	W2	RGR	DT
1989	69	69		4.23		
1990	82	151	4.23	5.02	0.78	0.88
1991	110	261	5.02	5.56	0.55	1.27
1992	121	382	5.56	5.95	0.38	1.82
1993	125	507	5.95	6.23	0.28	2.45
1994	58	565	6.23	6.34	0.11	6.40
1995	46	611	6.34	6.42	0.08	8.85
1996	444	1055	6.42	6.96	0.55	1.27
1997	475	1530	6.96	7.33	0.37	1.86
1998	532	2062	7.33	7.63	0.30	2.32
1999	568	2630	7.63	7.87	0.24	2.85
2000	456	3086	7.87	8.03	0.16	4.33
2001	417	3503	8.03	8.16	0.13	5.47
2002	420	3923	8.16	8.27	0.11	6.12
2003	442	4365	8.27	8.38	0.11	6.49
2004	463	4828	8.38	8.48	0.10	6.87
2005	431	5259	8.48	8.57	0.09	8.10
2006	513	5772	8.57	8.66	0.09	7.45
2007	424	6196	8.66	8.73	0.07	9.78
2008	416	6612	8.73	8.80	0.06	10.66
2009	405	7017	8.80	8.86	0.06	11.66
2010	396	7413	8.86	8.91	0.05	12.62
2011	343	7756	8.91	8.96	0.05	15.32
2012	368	8124	8.96	9.00	0.05	14.95
2013	364	8488	9.00	9.05	0.04	15.81
2014	385	8873	9.05	9.09	0.04	15.62
2015	412	9285	9.09	9.14	0.05	15.27
2016	343	9628	9.14	9.17	0.04	19.10
2017	246	9874	9.17	9.20	0.03	27.47
Total	9874					

4.6 Country wise Distribution of articles

Table 6 shows the country wise distribution of articles in the Journal "Nature Biotechnology" during the year 1989-2017. A total of 83 countries contributed 12105 articles. Out of the 12105 articles, the major contribution was from United states 4544 (37.54%) followed by United kingdom 866 (7.15%); Germany 476(3.93%); Canada 347 (2.87%); Switzerland 267 (2.21%); Japan 246 (2.03%); France 225 (1.86%); Netherlands 206 (1.70%); Australia 154 (1.27%) etc. The lowest contribution was from the following countries Benin,Bolivia, Cayman Islands, Federated States of Micronesia, Fiji, Iran, Jordan, Lithuania, Malta, Niger, Oman, Pakistan, Qatar, Romania, Serbia Slovakia, Swaziland, Tanzania, Uganda, Uruguay,Vanuatu The above mentioned countries equally contributed to the lowest contribution of articles category 1 (0.01%)

Table.6: Country wise Distribution of articles

Country	Article	Percentage	Cumulative	Cumulative %
United States	4544	37.54	4544	37.54
United Kingdom	866	7.15	5410	44.69
Germany	476	3.93	5886	48.62
Canada	347	2.87	6233	51.49
Switzerland	267	2.21	6500	53.70
Japan	246	2.03	6746	55.73
France	225	1.86	6971	57.59
Netherlands	206	1.70	7177	59.29
Australia	154	1.27	7331	60.56

5. Conclusion

For this study 29 years of Data from Scopus database were taken. The Journal" Nature Biotechnology" published 9874 articles. The average year wise publication of articles from the Nature Biotechnology is 340.48. In the Authorship pattern the major contribution of articles was from single authors 5131. Related to Type of Document published, the highest contribution was from article 4349 (44.04%) followed by Note 1987 (20.12%) and Short Survey 1168 (11.83%). The Growth ratio change from 0.79 to 9.65. The RGR in the year 1990 is 0.78 and the final year 2017 is 0.03. The values are decreased year by year . At the same time, the Doubling Time (DT) shows increasing trend, from the year 1990 is 0.88 and the final year 2017 is 27.47.

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