

ORIGINAL RESEARCH ARTICLE

Scientometric Dimensions of Food Science and Technology Research from 2007 to 2012**P. Gomathi***

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ABSTRACT

The journal of Food Science and Technology is a bimonthly journal and it was brought out first in the year 1964 and has been publishing original research papers in the area of food science and technology since then. The journal covers the areas of food science like production, processing, science and technology and engineering aspect of food. This study aims at analyzing the Scientometric dimensions of Food Science and Technology research from 2007 to 2012.

Key words: Scientometric dimensions, Food science and Technology research.

1. INTRODUCTION**Scientometrics**

Scientometrics is a branch of Library and Information Science. Scientometric tools can be used to measure and compare the scientific activities at various levels of aggregation including institutions, sectors, provinces and countries. They can also be used to measure research collaborations, to map scientific networks and to monitor the evolution of scientific fields.

Objectives of the study

- To know the volume wise contribution
- To find out the year wise distribution
- To examine the year wise average length of articles
- To find out the year wise average number of references per article
- To search the institution wise distribution of contribution
- To identify the geographical wise distribution
- To study the authorship pattern and determine the degree of collaboration
- To identify the proportion of single and multiple authored publications.

Hypothesis

Based on the above mentioned objectives, the following hypotheses have been formulated and tested in the present study.

- ✓ There is a significant difference in year wise distribution of publications.
- ✓ There is a significant difference in institution wise contribution of articles.
- ✓ There is a significant difference in the geographical distribution of articles.
- ✓ There is an association between the authorship pattern and their productivity.

There is a significant difference between single author and multiple authors with regard to degree of collaboration.

2. MATERIALS AND METHODS

The data pertaining to Indian Journal of Food Science regarding 739 contributions made from volume number 44 to 49. The analysis has seen made an authorship pattern, degree of collaboration, length of articles, geographical distribution of articles, average number of references, and institution wise contributions. The authorship pattern has been analyzed by using K. Subramaniam's degree of collaboration in quantitative terms. All the data were subsequently examined, observed, analyzed and tabulated for making valid observations.

Scope and Limitation

An attempt has been made to analyze the contributions from 36 issues of 6 volumes of the Journal of Food Science and Technology. The study covered during the year from 2007-2012.

Statistical techniques used in the study

Statistical Techniques serve the fundamental purpose of the descriptive and differential analysis. The following techniques were used in the study.

Mean, degree of collaboration, relative growth rate, chi-square test, one sample test, ANOVA.

3. DATA ANALYSIS AND INTERPRETATION

In this chapter the investigator has presented the collected data its interpretation by using a statistical calculation with the help of Microsoft Excel.

Table 1: Distribution of contribution (Issue-wise)

Year	Vol. No	No.of issues	No. of contributions	Percentage
2007	44	6	151	20.43
2008	45	6	123	16.64
2009	46	6	141	19.08
2010	47	6	116	15.70
2011	48	6	112	15.16
2012	49	6	96	12.99
Total		36	739	100

The above table showed that distribution of contributions in each issue of the journal. The total number of contributions in 36 issues of 6 volumes. The maximum number of articles were published in the year 2007 (151) and a minimum of 2012 (96) articles.

It is inferred from the ANOVA table that the calculated P-value is significant. $P < 0.01$. So the null hypothesis is rejected and alternate hypothesis is accepted. So it is concluded that there is a significant difference in year wise distribution of publications.

Get of 739 articles (663 were research papers) and 76 were short communications. Maximum number

of articles was published during 2007 constituting 20.43% of the total contributions. In the year 2012 minimum number of contributions, i.e. 12.99% were published.

Table 2: Year wise distribution of Publications

Year	Research Papers	Short communications	Total No. of Articles	Percentage	Cumulative No. of Articles	Cumulative Percentage
2007	145	6	151	20.43	151	20.43
2008	112	11	123	16.64	274	37.07
2009	120	21	141	19.08	415	56.16
2010	104	12	116	15.70	531	71.85
2011	98	14	112	15.16	643	87.00
2012	84	12	96	12.99	739	100
Total	663	76	739	100.00		

Ha: There is a significant difference in year wise distribution of publications.

ANOVA						
Source of Variation	SS	Def	MS	F	P-value	F crit
Rows	1844.708	5	368.9417	2.229292	0.10512	2.901295
Columns	16760610	3	5586870	33758.09	0.00616	3.287382
Error	2482.458	15	165.4972			
Total	16764937	23				

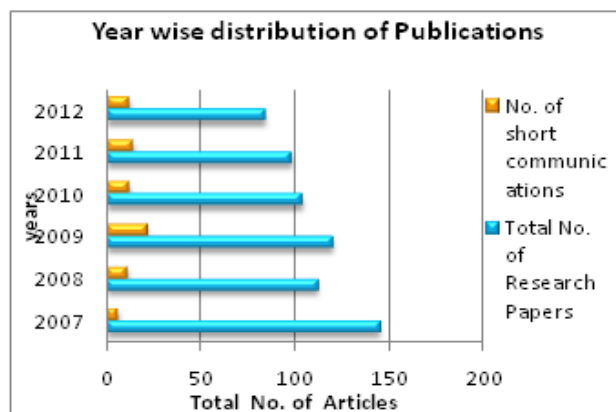


Figure 1: Year wise distribution of publications

Table 2.1: Relative Growth Rate and Doubling Time

Year	Total No. of Articles	Cumulative No of articles	W1	W2	R (a)	Mean (a)	Doubling time Dt(a)	Mean Doubling time
2007	151	151		5.02				
2008	123	274	5.02	5.61	0.60		1.16	
2009	141	415	5.61	6.03	0.42		1.67	
2010	116	531	6.03	6.27	0.25		2.81	
2011	112	643	6.27	6.47	0.19		3.62	
2012	96	739	6.47	6.61	0.14	0.32	4.98	2.85
Total	739							

Table 3: Year wise Length of Articles

No. of pages	Years							Total	Percentage
	2007	2008	2009	2010	2011	2012			
1to5	131	98	124	46	34	15	448	60.62	
6to10	19	24	14	53	72	65	247	33.43	
11to15	1	1	3	17	6	16	44	05.95	
Total	151	123	141	116	112	96	739	100.00	

Table 4: Year wise distribution of References per article

No. of References	Year wise number of articles						No. of articles	Percentage
	2007	2008	2009	2010	2011	2012		
1-10	17	8	11	7	-	2	45	6.09
11-20	63	60	59	29	44	18	273	36.94
21-30	43	31	42	35	40	21	212	28.69

31-50	20	14	21	20	30	49	154	20.84
Above 50	6	9	8	7	10	15	55	7.44
Total	149	122	141	98	124	105	739	100.00

Table 5: Institution wise contribution of articles

Institution	No. of articles	Percentage	Cumulative Articles	Cumulative Percentage
Universities	273	36.94	273	93.94
Research Institutions	168	22.73	441	59.67
Colleges	110	14.89	551	74.56
Research Laboratory	49	6.63	600	81.19
Research Centre	38	5.14	638	86.33
Others	101	13.67	739	100
Total	739	100		

One-Sample Statistics

Compare	Mean	Std. Deviation	t-value	p-value
No of articles	93.20	52.29	3.98	0.01 (S)
Cumulative articles	593.80	109.83		

Ha: There is a significant difference in institution wise contribution of a

The doubling time for publications has been increased during 2007-2012. The mean doubling time is 2.85 and the relative growth rate shows a down trend which means the rate of increase is low in terms of volume; this is highlighted by the doubling time of publications which is higher than its relative growth rate.

(Table 3) reveals that the majority of articles 448 (60.62%) have the length of 1-5 pages followed by 247 (33.43%) articles with 6-10 pages, and the remaining 44 (5.95%) articles have the length of 11-15 pages.

The majority of articles carry 11 - 20 references (36.94%) and (28.69%) have 21-30 references appended at the end of the articles. About 6.09% of the remaining articles have a length of 1-10 pages.

The (Table 5) showed that the majority of the articles 273 (36.94%) was contributed from Universities. This is followed by research institutions with 168 (22.73%) and colleges with 110 (14.89%) articles. Others were 101 (13.67%) articles. From the obtained results that the stated hypothesis is accepted. So it is concluded that there is a significant difference in institution wise contribution of articles. $P < 0.01$.

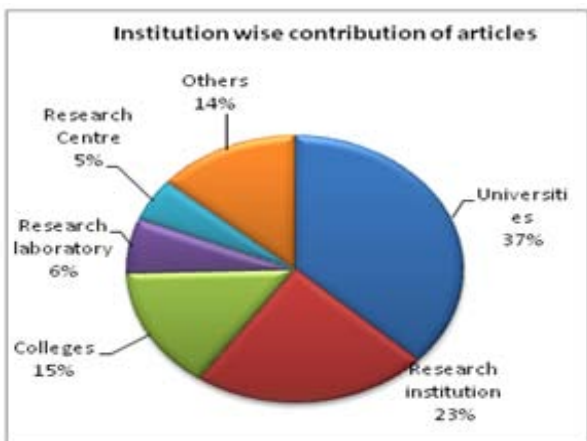


Figure 2: Institution wise contribution of articles

Table 6: Geographical wise Distribution of the Articles

S. No	Countries	No. of articles	Percentage
1	India	610	82.54
2	Pakistan	12	1.63
3	China	23	3.11
4	Nigeria	30	4.06
5	Turkey	25	3.38
6	Others	39	5.28
Total		739	100.00

Ha: There is a significant difference in the geographical distribution of articles.

Calculated chi-square	Df	p-value
1.43	5	0.001(S)

It is inferred from the above chi-square test, the calculated P-value is significant, i.e. $P < 0.01$. Hence the null hypothesis is rejected and alternate hypothesis is accepted. So it is concluded that there is a significant difference on geographical distribution of articles

The articles (82.54%) have been contributed by Indian authors (Table 6). About 4.06% articles have been contributed by scientists from Nigeria. Similarly, the scientists serving the educational and research institutes of 25 articles. Only 39 articles have been written in in international collaboration by authors.

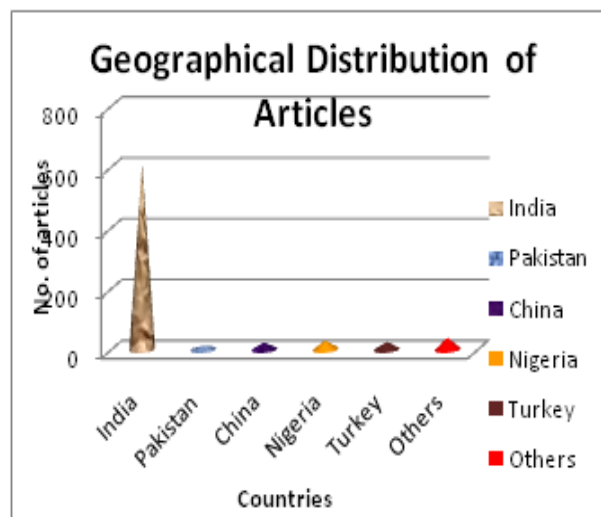


Fig 3: Geographical distribution of Articles

Table 7: Year wise Authorship Pattern of Journals and Citations

Year	Single Author	Two Authors	Three Authors	Four Authors	Five Authors	More than five Authors	No. of Articles
2007	10	56	46	25	10	4	151
2008	6	30	44	29	7	7	123
2009	4	44	41	30	13	9	141
2010	3	33	41	22	8	9	116
2011	2	28	37	19	9	17	112
2012	2	22	31	26	9	6	96
Total	27 (3.65)	213 (28.82)	240 (32.48)	151 (20.43)	56 (7.58)	52 (7.04)	739 (100%)

Calculated chi-square	Df	p-value
35.96	25	0.001 (S)

Table 8: Year wise Single Vs Multiple Authored Publications and Degree of Collaboration

S. No	Year	Single author	Multiple author	Total NS+NM	DC=NM+NS/NM
1	2007	10	141	151	0.93
2	2008	6	117	123	0.95
3	2009	4	137	141	0.97
4	2010	3	113	116	0.97
5	2011	2	110	112	0.98
6	2012	2	94	96	0.98
	Total	27	712	739	0.96

One-Sample Statistics

Compare	Mean	Std. Deviation	t-value	P-value
SINGLE	4.50	3.08	3.57	0.01 (S)
MULTIPLE	118.67	17.63		

It is inferred from the above chi-square test, the calculated P-value is significant, i.e $P < 0.01$. Hence the null hypothesis is rejected and alternate hypothesis is accepted. So it is concluded that there is an association ship between authorship pattern and their productivity.

(Table 8) reveals the authorship pattern of the articles published during the period of study. Maximum number of articles was contributed by three author's i.e.240 (32.48%). This is followed by two authors with 213 (28.82%) articles, four authors with 151 (20.43%) articles, five authors contributed 56 (7.58%) articles, more than five authors with 52 (7.04%) and single author with 3.65% of the total articles.

The degree of collaboration in the field of Journal of Food Science and Technology has been determined and given in table 9. The degree of collaboration is calculated for 6 years. As per the statistics, there is a significant difference between single and multiple authors with regard to degree of collaboration.

CONCLUSION

The present study aims at analyzing the research publications from source "Journal Food Science and Technology" during the year 2007-2012. In academic and scientific work, publication is the chief means of communicating research, and reward hence a central social process in the institutions. Therefore, scientists receive professional recognition, promotion, and funding for future research. The Scientometric studies are frequently used to assess research publication and to generate information that can be used by policy makers and experts. This study has proven to be a useful tool in the assessment of research publication of scientists in Journal of Food Science and Technology.

REFERENCES

1. Cantos-Mateos, G *et al.* (2012). Stem cell research: bibliometric analysis of main research areas through key word plus. *Aslib Proceedings*, 64, 6,561-590.
2. Gupta, B.M. (2013). A Scientometric analysis of national publication in output in S&T (2001-10), *DESIDOC Journal of Library and Information Technology*, 33, 1, Jan. 32-44.
3. Poornima, A. *et al.* (2011). Mapping the Indian research productivity of food science and technology: A scientometric analysis. *Food Biology*, 1 (1), 36-41.
4. Subramaniam, K. (1983). Bibliometrics Studies of Research Collaboration: A review. *Jnl.Inf.Sc.*6; 1983; 34.