

Journal of Food Science and Technology: A bibliometric study

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Bibliometric analysis of 779 articles published, along with citations in five volumes 37(2000) to 41(2004) has been carried out. A similar study was also carried out for the maiden volume of the same journal for the year 1964. The number of contributions and their distribution in different volumes, authorship pattern, foreign and Indian authored contributions, institution wise contribution, citations, types of publications cited, geographical distribution of contributions national and International as well as physical growth of the journal have been studied. Results indicated an increase in the number of contributions in successive volumes with India being the major contributor both in the maiden volume as well as in the five volumes studied. The highest number of contributions is by the joint authors (two). The growth and popularity of the journal is showing a steady upward trend, though contributions from the developed nations form only 15% of the total.

Introduction

Research activities have resulted in considerable output of scientific literature and the number of periodicals has grown in every branch of science. Food science and technology is a discipline concerned with all technical aspects of food. It starts with the harvesting or slaughtering, and ends with its cooking and finally consumption. The activities of this discipline includes the development of new food products, designing of processes to produce these foods, selection of packaging materials, shelf life studies of the products, sensory evaluation of the products by expert panels or the potential customers, as well as microbiological and chemical testing.

Food science and technology is a highly interdisciplinary applied science incorporating concepts from many different fields including microbiology, chemical engineering, biochemistry etc. This discipline also includes sub disciplines like food safety, food preservation, food engineering, sensory analysis, food chemistry, food packaging and food technology which include the technological aspects.

The IUFoST (International Union of Food Science and Technology) is the main organization for food science and technology to which all the Associations/Institutes are affiliated the world over. The principle organization

in the US for food science and technology is the Institute of Food Technologists (IFT) headquartered at Chicago. AFST(I) (Association of Food Scientists and Technologist, India) with its HQ at CFTRI, Mysore, India is the Indian organization representing India and is affiliated to the IFT Chicago.

Journals like *Critical Reviews in Food Science and Nutrition*, *Journal of Food Protection*, *Food and Chemical Toxicology*, *Journal of Agriculture and Food Chemistry*, *Food and Chemical Toxicology*, *International Journal of Food Microbiology* etc., are published from the USA or from Europe. The AFST(I) publishes the *Journal of Food Science and Technology* (JFST) journal from India. This is one of the journals that is abstracted and Indexed in leading abstracting and indexing journals in the field of food science and technology. Since this journal is the official publication of the AFST(I) it was selected for this study.

This bibliometric study presents the analysis of the journal in its present form and to that of the maiden volume and its contents to gain an understanding about the type of publications, their pattern, and authorship and so on.

The *Journal of Food Science and Technology* is a bimonthly journal and was brought out first in the year 1964 and has been publishing original research papers

Table 1 — Distribution of contribution (volume wise)

Years	Vol. No.	No. Issues	Contributions	%
2000	37	6	149	19.13
2001	38	6	158	20.28
2002	39	6	146	18.74
2003	40	6	157	20.15
2004	41	6	169	21.7
5 years	5 vol	30	779	100

in the area of food science and technology since then. The journal covers the areas of food science like production, processing, science & technology and engineering aspects of food.

This journal is indexed and abstracted in a large number of secondary sources like AGRIS (India), BIOSIS (USA), *Chemical Abstracts* (USA), *Current Contents – Agricultural, Biology, and Environmental Sciences* (USA), *CAB Abstracts* (UK), *Food Science and Technology Abstracts* (UK), *International Packaging Abstracts* (UK), ISI (USA), and Science Citation Index (USA).

Objectives of the study

1. To examine and study the volume wise distribution of contributions;
2. To find the average number of contributions per volume;
3. To study the authorship pattern of the contributions made;
4. To study the number and types of citations for individual publications;
5. To analyze the use of various types of documents by the contributors/authors;
6. To study the geographical distribution of contributions both at National and International level;
7. To indicate the number of pages per volume; and
8. To compare recent volumes with the maiden issue/ volume.

Methodology

Data of all the 30 issues for the five years (2000 to 2004) from the source journal, *The Journal of Food Science*

Table2 — Distributions of citations (volume wise)

Year	Vol. No.	No. Citations	%
2000	37	2458	17.34
2001	38	2701	19.06
2002	39	2986	21.07
2003	40	2855	20.14
2004	41	3174	22.39
		14,174	100

and Technology and the maiden volume published in the year 1964 were recorded onto sheets with pre-designed columns. All the required data like number of authors, number of papers, contributions in each volume, their types, affiliations of the authors (Institution wise), and their geographical locations both at national and international levels as well as the number of pages per volume were tabulated. The data was then subjected to analysis as per the objectives of the study.

Analysis

Distribution of contributions

The total number of contributions in the five volumes was 779 (Table 1). The year 2004 showed the highest number of 169 contributions (21.70%). In the year 2001, 158 contributions (20.28%) were made followed by 157 (20.15%) in 2003, 149 (19.13%) in 2000 and 146 (18.74%) in the year 2002.

Analysis of citations

The 779 contributions accounted for a total of 14,174 citations as shown in Table 2. Vol. 41, received the highest number of citations (22.39%) followed by Vol. 39 (21.07%), Vol. 40, (20.14%), Vol. 38 (19.06%) and Vol. 37 (17.34%) the lowest. The number of citations as shown in Table 3 showed a gradual increase in frequency towards the year 2004 though a marginal decrease was observed in the year 2003.

Table 3 — Average citations per contribution per volume

Year	Vol. No.	No. of contributions	No. of citations	Average
2000	37	149	2458	16.5
2001	38	158	2701	17.1
2002	39	146	2986	20.45
2003	40	157	2855	18.18
2004	41	169	3174	18.78
		779	14,174	18.31

The average number of citations received per contribution per volume revealed that Vol.39 had 146 contributions which are the highest with average being 20.45. The overall average citation per contribution was 18.31.

Authorship pattern

The analysis of the data showed that the maximum number of authors who contributed to the journal had a tendency to work in collaboration. From Table 4 it can be seen that single authored papers were the minimum and two authored papers the maximum with 33.88% (264). These results are similar to the findings of earlier studies¹⁻⁸.

Contributions (National and International)

Data pertaining to the contributions made by scientists in India (Table 5) showed that, 660 contributions have been made by researchers from various institutions. 54.40% contributions of these had come from the universities followed by 37.88% from R&D institutions and 7.72% from colleges. The highest number of contributions by the universities is similar to the findings of Vijay⁹ and Narang¹⁰.

Table 6 indicates the contribution by overseas researchers to the journal. The total number of foreign contributions was 119 with 23.80 being the average for the five years. Here also it was observed that the contributions from the universities are the highest (80.67%).

Types of documents and their citations

Various kinds of published documents are used by researchers during the course of their work. These documents may be in the form of books, journals or other published literature like reports, conference proceedings,

Table 4 — Authorship pattern of contributions

Authors	No. of contributions	%
One	52	6.67
Two	264	33.88
Three	242	31.06
Four	120	15.4
Five+	101	12.96
Total	779	100

symposia etc. Literature from these sources is being cited by the workers as per their use and needs.

It is seen from Table 7 that out of the total of 14,174, 10069 citations are based on journal publications followed by books (2934) and others (1171). Literature grouped under others for this study include thesis, dissertations, standards, technical reports, project reports, annual reports, proceedings, conference publications, patents and web sources.

Geographical distribution of contributions (National and International)

Contributions were received from researchers both from within India and overseas. On analysis of the 779 papers published in the journal over the five years period from (2000 to 2004) it was found that 660 of the 779 were from India (Table 8). The breakup of the contributions state wise showed Karnataka topped the list with 18.79% papers followed by Punjab with 13.5%, Uttarpradesh with 11.7% and Maharashtra 10.01%.

Amongst the contributions to the JFST from all over the world (Table 9), country wise, India stands first with 84.72% followed by Nigeria 5% and Turkey 5%.

The maiden issue of 1964 – Vol. 1

The *Journal of Food Science and Technology* came into existence as a quarterly publication in 1964. In its very

Table 5 — Indian contribution (Institution wise)

Vol. No.	Year	Univ.	College	Institute	Total
37	2000	67	12	47	126
38	2001	78	8	48	134
39	2002	67	9	40	116
40	2003	78	13	47	138
41	2004	69	9	68	146
5 Vols	Total	359	51	250	660
%		54.40	7.72	37.88	100

Table 6 — Foreign contributions (Institution wise)

Vol. No.	Year	Univ.	College	Institute	Misc.	Total
37	2000	19	-	4	-	23
38	2001	17	-	5	2	24
39	2002	22	3	4	1	30
40	2003	18	-	1	-	19
41	2004	20	-	3	-	23
5 Vol	Total	96	3	17	3	119
%		80.67	2.52	14.29	2.52	100

Table 7 — Types of publications cited

Vol. No.	Books	Journals	Others	Total
37	439	1828	191	2458
38	650	1804	247	2701
39	633	2166	187	2986
40	597	2014	244	2855
41	615	2257	302	3174
Total	2934	10069	1171	14174

first volume, the journal had 17 contributions, of which 16 were from India while only one was from the USA.

The distribution of the articles shows equal distribution in all the four issues except in the fourth, where the number of articles is five when compared to four in the rest. Authorship pattern shows three publications with four authors, four publications with three authors, five publications with two authors and two publications with a single author. The average citations per contribution work out to be 23.29.

The citation pattern of the authors indicates that 73.48% (291) are from Journals, 23.74% (94) from books and 2.78% (23) from other sources. Research institutes have

contributed 16 of the seventeen papers and the remaining one is by a university.

Comparison of the maiden volume with the five volumes

1. The periodicity of the journal has changed from quarterly at inception to bi-monthly at present.
2. The first volume had only 17 contributions which has risen to 169 in the 2004 volume.
3. Percentage of papers with two authors was 29.41% in the maiden issue and for the present study for the five volumes it is 33.88%.
4. The average citations per volume in the maiden volume were 23.29% as compared to 18.31% for the five volumes in 2004.

Table 8 — Geographical distribution of contributions (National)

Sl. No.	Name of State	Contributions	%	Rank
1	Karnataka	124	18.79	1
2	Punjab	89	13.5	2
3	Uttar Pradesh	77	11.7	3
4	Maharashtra	66	10.01	4
5	Harayana	57	8.63	5
6	Tamilnadu	38	5.76	6
7	Andhra Pradesh	36	5.45	7
8	Madhya Pradesh	30	4.54	8
9	Delhi	27	4.09	9
10	West Bengal	22	3.3	10
11	Himachal Pradesh	21	3.2	11
12	Gujarat	15	2.3	12
13	Kerala	13	1.96	13
14	Assam	12	1.81	14
15	Rajasthan	12	1.81	14
16	Jammu	7	1.06	15
17	Bihar	4	0.6	16
18	Manipur	4	0.6	16
19	Orrisa	4	0.6	16
20	Nagaland	1	0.15	17
21	Pondicherry	1	0.15	17
	Total	660	100	

5. The journal publications have been the major source of references cited both in the maiden volume (73.48%) as well as the five volumes studied (71.03%).
6. Karnataka has been the major contributing state followed by Punjab both in the maiden volume as well as the five issues studied.
7. India has been the major contributor country geographically both in the maiden volume as well as the five volumes studied. USA was the only country to have contributed in the maiden volume, but presently thirty two foreign countries are contributing to the journal. The ratio of National to International contributions is 85.15.
8. The average number of pages per contribution was 5.76 for the maiden volume and is 4.51 for the five volumes in the present study.
9. The number of pages in the maiden volume was 98 and the average pages in the five volumes studied is 702.
10. Universities have contributed maximum followed by research institutes.

Conclusion

The Journal of Food Science and Technology published by AFST(I) has grown manifold both in respect of

Table 9 — Geographical distribution of contributions (International)

Sl. No	Name of Country	Contributions	%	Rank
1	India	660	84.72	1
2	Nigeria	39	5	2
3	Turkey	12	1.5	3
4	West Indies	9	1.1	4
5	Brazil	7	0.89	5
6	USA	5	0.64	6
7	Sri Lanka	4	0.51	7
8	Japan	4	0.51	7
9	Malaysia	3	0.4	8
10	Iran	3	0.4	8
11	Egypt	3	0.4	8
12	Canada	3	0.4	8
13	Sudan	2	0.3	9
14	Spain	2	0.3	9
15	Poland	2	0.3	9
16	Nepal	2	0.3	9
17	Ethiopia	2	0.3	9
18	Bangladesh	2	0.3	9
19	Zimbabwe	1	0.12	10
20	Venezuela	1	0.12	10
21	Thailand	1	0.12	10
22	Saudi Arabia	1	0.12	10
23	Paupa New Guinea	1	0.12	11
24	Pakistan	1	0.12	12
25	Oman	1	0.12	13
26	Mexico	1	0.12	14
27	Ireland	1	0.12	15
28	Germany	1	0.12	16
29	China	1	0.12	17
30	Chile	1	0.12	18
31	Cameroon	1	0.12	19

coverage, contributions and popularity. The average number of contributions per volume has shown a ten fold increase leading to the increase in its pages / volume by nearly seven times. Journals which are a nascent source of information have been cited most right in the first volume as well as in the five volumes that have been studied. The number of contributions from the African and the South American nations is significant. The journal also seems to be popular among the research scholars of the universities as seen from the highest number of contributions received from them.

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