

Food Microbiology Research output through Web of Science: A Study

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ABSTRACT

Food Microbiology is a one of the importance study of microbiology and its related to the micro organisms involved in the Food particles, composition, and processing related. It is essential of Food production and composition of foods and the changes occur when they are subjected to processing. The Food Microbiology research output by scientists was collected using the web of science (WoS) citation database and its limited for the selected year (2001 - 2020) were analyzed. The research study results found that 2571 records were published in Food Microbiology research by the authors. The paper briefly discusses research out in different categories such as year wise output, source wise, topmost ranking for journals, author, institution, Countries and Keywords wise. Totally 598 research articles are a significant share among the research documents. Totally 766 journals, 9013 authors were published, and the total number of keywords used in the study research area was 5648, 2797 Institutions involved, 107 countries collaborated and the Global citations Score 11473. The highest number of publications made by researchers was 68 in the year 2002. Among the top-rated journals, the International journal of food Microbiology top place with 253 research papers.

KEYWORDS: Food Microbiology, TGCS, WoS.

INTRODUCTION

Food Microbiology is a one of the importance study of microbiology and it's related to the micro organisms involved in the Food particles, composition, and processing related. It is essential of Food production and composition of foods and the changes occur when they are subjected to processing. It is very essential for human life and maintains body and wealth. It also gives a quantum of human life activities in the Physiological systems.

Web of Science

Web of Science is one of the authentic bibliographical citation database and its provide the scholarly literature indexing and Scientific information with specialized tool providing data on essential areas in all kinds of research (Yao et al., 2014). Furthermore, the Web of Science provides full search fields, namely keywords, country, organization, author, and references (Boyack et al., 2005) which was highly helpful for the present study. Web of

Science provides peer-reviewed, impact factor journals, books, conferences proceedings (Sankar, 2020). Recently, different indicators are used to evaluate the impact of a particular area of research or individual research output. The most critical indicators are citations, h index, Total Global Citations Scores (TGCS), and Total Local Citations Scores (TLCS). The histcite software can be used to get these parameters for assessing the impact of specific research field or individual research output.

Review of Related Literature

Sankar, M (2020) analyzed the research output of horticulture research output by scientists was retrieved from the Web of Science database for the period 2000 to 2019..He reported that 267 research articles are a significant share than other research documents, 202 journals were published 441 records by the contribution of 1192 authors. The total number of keywords used in the study research area was 1717. The highest number of publications made by researchers was 46 in the year 2018. The Horticultural Scientists preferred the publication in the titled on Journal of Agricultural sciences retained top place by publishing 62 research papers.

Sankar, M and Srinivasaragavan (2012) described that agriculture research output for the period from 1970 to 2012. He reported that performance of a continent and country in a particular discipline of scientific research. The study result found that web of science, applied various statically analytical tools part; Specialization Index (SI), Author Productivity, Authorship Pattern, Collaborative Index, Lotka's Law, and Pareto Principle (80 X 20 Rule) also taken up in their research.

OBJECTIVES OF THE STUDY

- To find out the year-wise research output of Food Microbiology.
- To identify the source wise distribution in the Food Microbiology research output.
- To know the frequency of topmost journals in Food Microbiology research output.
- To know the frequency of top most authors in Food Microbiology research in the field.
- To identify the frequency of institution in the field of Food Microbiology research.
- To identify the frequency of country wise in Food Microbiology research.
- To identify the mostly occurrence keyword in the Food Microbiology research area.

METHODOLOGY

Web of Science has citations and indexing services available online, which is maintained by Clarivate Analytics formerly Thomson Reuters. The present study involves three steps for collecting and analyzing the data for the selected study period. Firstly, the data for the selected period (2001 to 2020) was collected from Web of Science (WoS) database utilizing the search query for "Food Microbiology." Secondly, the other queries were excluded from the collected data and restricted to Food Microbiology subject related records that to authors. Finally, the collected data were further analyzed by using histcite software version is 12.03.17.

RESULTS AND DISCUSSION

The year-wise research documents and total citation scores at the global level for the Food Microbiology subject are presented in Table 1. For the selected study period, 2571 research documents related to Food Microbiology research were published by authors. The average number of publications per annum for scientists was noted as 128.55. The highest and lowest number of research documents was found as 228 and 202 in 2020 and 2019, respectively. More than 100 records found as a yearly research output in India the other remaining period from 2001 to 2006.

Table – 1. Year wise research output of Food Microbiology

Sl. No	Year	Records	Percentage
1	2001	88	3.4
2	2002	71	2.8
3	2003	75	2.9
4	2004	77	3
5	2005	91	3.5
6	2006	88	3.4
7	2007	111	4.3
8	2008	105	4.1
9	2009	118	4.6
10	2010	106	4.1
11	2011	127	4.9
12	2012	126	4.9
13	2013	150	5.8
14	2014	128	5
15	2015	138	5.4
16	2016	180	7
17	2017	178	6.9
18	2018	184	7.2
19	2019	202	7.9
20	2020	228	9.0
	Total	2571	100

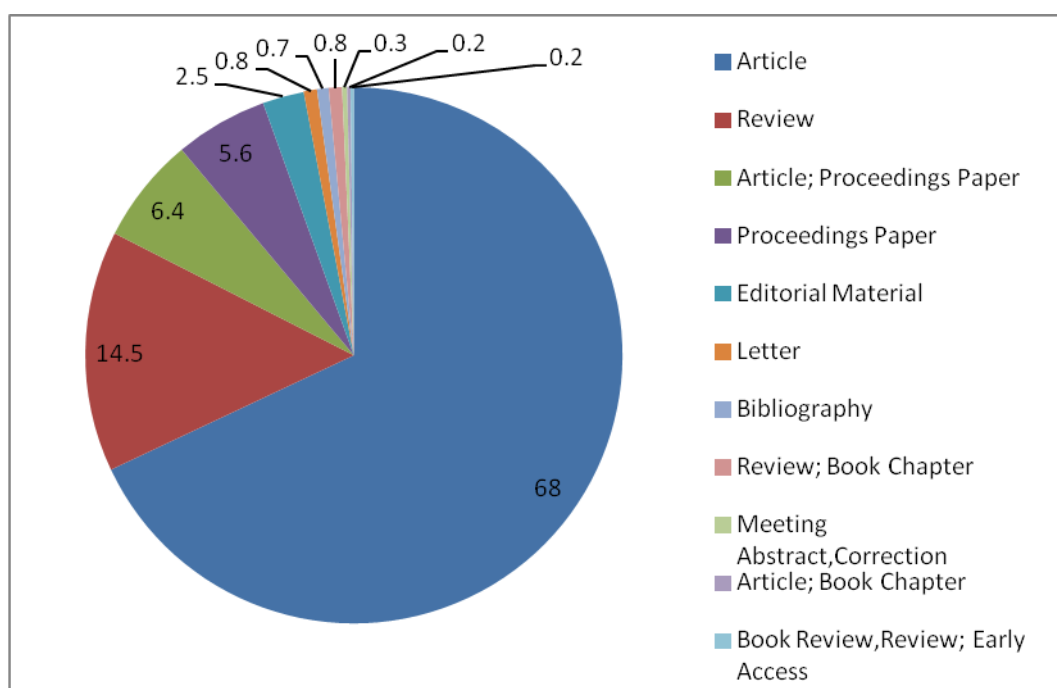


Fig. 1. Research source documents published in Food Microbiology (2001 to 2020).

Food Microbiology Research output through Web of Science: A Study

The research documents published in the Food Microbiology field by authors for the study period are shown in Fig. 1. Publications about Food Microbiology research works were in three different categories, such as Journal articles, reviews and proceedings paper. The research articles published in different journals (68%) review articles (14.5%), Articles; Proceedings paper (6.4%), Proceedings paper (5.6%), Editorial material (2.5%), Letter (0.8%), Bibliography (0.7%), Review, Book Chapter (0.8%) etc.

Table - 2. Topmost 20 journals preferred by authors published Food Microbiology research

Sl. No	Name of the journal	Records	TGCS
1	INTERNATIONAL JOURNAL OF FOOD MICROBIOLOGY	253	8260
2	FOOD MICROBIOLOGY	100	3022
3	JOURNAL OF AOAC INTERNATIONAL	84	446
4	FRONTIERS IN MICROBIOLOGY	61	1020
5	JOURNAL OF FOOD PROTECTION	60	1893
6	FOOD CONTROL	56	804
7	JOURNAL OF APPLIED MICROBIOLOGY	51	1883
8	APPLIED AND ENVIRONMENTAL MICROBIOLOGY	50	2081
9	CLINICAL MICROBIOLOGY AND INFECTION	34	1111
10	FOOD RESEARCH INTERNATIONAL	33	623
11	JOURNAL OF FOOD SCIENCE	32	624
12	JOURNAL OF MICROBIOLOGY IMMUNOLOGY & INFECTION	28	285
13	INTERNATIONAL JOURNAL OF FOOD SCIENCE & TECHNOLOGY	23	226
14	JOURNAL OF MICROBIOLOGICAL METHODS	22	1154
15	MEAT SCIENCE	22	1013
16	LWT-FOOD SCIENCE AND TECHNOLOGY	21	394
17	JOURNAL OF FOOD ENGINEERING	20	414
18	JOURNAL OF FOOD SAFETY	18	89
19	TRENDS IN FOOD SCIENCE & TECHNOLOGY	18	805
20	JOURNAL OF CLINICAL MICROBIOLOGY	17	530

The details of the top 25 journals preferred by researchers to publish their Food Microbiology research works during the study period are presented in table 2. The analyzed results show that the topmost journals are first in INTERNATIONAL JOURNAL OF FOOD MICROBIOLOGY (253 nos.) the second rank for FOOD MICROBIOLOGY (100 nos.) and third rank for JOURNAL OF AOAC INTERNATIONAL (84 nos). The NAAS rating for 2021 of these journals is more than 6.00 and maximum number of published journal titles.

Table - 3. Frequency of author ranking in Food Microbiology research output (Top 20)

Sl. No	Author	Records	TGCS
1	Van Impe JF	56	1987
2	Geeraerd AH	32	1615
3	Membre JM	20	308
4	Agin J	19	28
5	Bird P	19	36

6	Devlieghere F	19	367
7	Goins D	19	36
8	Crowley E	18	36
9	Baranyi J	17	485
10	Couvert O	17	329
11	Garcia-Gimeno RM	17	360
12	Peleg M	17	388
13	Perez-Rodriguez F	17	200
14	Bernaerts K	15	552
15	Akkermans S	13	67
16	Ross T	13	717
17	Valero A	13	190
18	Zwietering MH	13	481
19	Cocolin L	12	369
20	Flannery J	12	32

The author's wise frequency of Food Microbiology research output published in the study period is presented in Table 3. The number of research papers published during the period, ranking first place with Van Impe JF (56 articles), second places Geeraerd AH (32 nos) and third places backed by Membre JM (20 articles), Agin J , Bird P, Devlieghere F, Goins D (19 articles) and Crowley E (18 articles), Baranyi J, Couvert O, Garcia-Gimeno RM , Peleg M, Perez-Rodriguez F(17 articles) and all other authors contributed 15 and below articles respectively. In the case of TGCS, Van Impe JF ranked first place with 1987 scores. The second place by Geeraerd AH (1615) and third places ranked for Bernaerts K (552) and Baranyi J (485 TGCS).

Table - 4. Frequency of Institution wise in Food Microbiology research output (Top 20)

Sl. No	Name of the Institute	Records	TGCS
1	Katholieke Univ Leuven	80	2858
2	INRA	51	1656
3	US FDA	42	996
4	Univ Ghent	37	1126
5	ARS	34	1058
6	Univ Cordoba	29	481
7	Univ Sao Paulo	28	380
8	Tech Univ Denmark	26	1189
9	CSIC	25	616
10	USDA ARS	25	867
11	Univ Massachusetts	24	474
12	Inst Pasteur	21	992
13	Inst Food Res	20	947
14	Agr Univ Athens	19	559
15	Q Labs Inc	19	38
16	Univ Estadual Campinas	19	209

Food Microbiology Research output through Web of Science: A Study

17	Univ Georgia	19	440
18	Univ Tasmania	19	803
19	Rutgers State Univ	17	277
20	Univ Bologna	17	361

Based on research output, details of institutions ranked based on their performance in the field of Food Microbiology are given table 4. For the study period, the first place was the Katholieke Univ Leuven with 80 articles, and TGCS Score was 2858. The INRA has ranking second place with 51 records and TGCS 1656. Third place for the US FDA by 42 published records with 996 numbers for TGCS.

Table - 5. The frequency of Country wise collaboration in the field of Food Microbiology research in India (Top 20)

Sl. No	Country	Records	TGCS
1	USA	537	17137
2	France	216	6493
3	UK	216	6559
4	Spain	185	5023
5	Brazil	164	2161
6	Italy	158	4349
7	Germany	138	3569
8	Belgium	131	5586
9	Peoples R China	122	2290
10	Netherlands	115	3629
11	Canada	99	3650
12	Australia	76	3216
13	Switzerland	63	1743
14	India	58	1620
15	Denmark	57	2147
16	Ireland	57	3393
17	Turkey	53	568
18	Japan	51	1881
19	Greece	49	1610
20	South Korea	49	1029

From collected data, it is observed that 107 keywords found in the results of the Food Microbiology research output. Among the countries, “USA” 537 documents contributed, “FRANCE” ,UK were 216 documents contributed, “SPAIN” has 185 documents , “BRAZIL” has 164 documents appeared in the data on research output. The highest Global citation score for the country search was “USA” for 17137. “UK” has 6559 and “FRANCE” for 6493, and all other keywords appeared more than 1000 TGCS only few not credited TGCS in the topmost countries.

Table - 6. The frequency of overseas collaboration in the field of Food Microbiology research in India (Top 25)

Sl. No	Keywords	Records	TGCS
1	FOOD	545	12302
2	MICROBIOLOGY	349	6941
3	GROWTH	285	5830
4	MICROBIAL	238	7698
5	DETECTION	192	3879
6	LISTERIA	169	3961
7	SALMONELLA	147	3020
8	MONOCYTOGENES	137	3585
9	BACTERIA	131	4634
10	MODEL	130	2576
11	MICROBIOLOGICAL	129	2011
12	COLI	128	2705
13	FOODS	128	2866
14	PREDICTIVE	128	2322
15	BASED	125	2676
16	QUALITY	121	1513
17	USING	120	2014
18	BACTERIAL	111	2972
19	ESCHERICHIA	111	2544
20	ANALYSIS	110	2421

From collected data, it is interesting to note that 5648 keywords found in the results of the Food Microbiology research. Among the keywords, “FOOD” 545 times occurred, “MICROBIOLOGY” has 349 times, “GROWTH ” has 285 times, “MICROBIAL” has 238 times and “DETECTION” has 192 times were occurred in the data on research output. The highest Global citation score for the keyword search was “FOOD” for 12302. “MICROBIAL” has 7698 and “MICROBIOLOGY” for 6941, and all other keywords appeared more than 2000 TGCS only few not credited TGCS in the topmost keywords.

CONCLUSION

The Food Microbiology research output has shown significant publications selected study period, 2571 research documents related to Food Microbiology research were published by authors. The average number of publications per annum for scientists was noted as 128.55. The highest and lowest number of research documents was found as 228 and 202 in 2020 and 2019. The research articles published in different journals (68%) review articles (14.5 %), Articles; Proceedings paper (6.4%). INTERNATIONAL JOURNAL OF FOOD MICROBIOLOGY (253 nos.) the second rank for FOOD MICROBIOLOGY (100 nos.) and third rank for JOURNAL OF AOAC INTERNATIONAL (84 nos). The author ranking most prolific author first place with Van Impe JF (56 articles), second places Geeraerd AH (32 nos) and third places backed by Membre JM (20 articles), Agin J , Bird P, Devlieghere F, Goins D (19 articles) and Crowley E (18 articles), Baranyi J, Couvert O, Garcia-Gimeno RM , Peleg M, Perez-Rodriguez F(17 articles) and all other authors contributed 15 and below articles respectively. An Institutional wise result found that

first place was the Katholieke Univ Leuven with 80 articles, and TGCS Score was 2858. The INRA has ranking second place with 51 records and TGCS 1656. Among the 107 countries, “USA” 537 documents contributed, “FRANCE ”,UK were 216 documents contributed, “SPAIN” has 185 documents , “BRAZIL” has 164 documents appeared in the data on research output. The highest Global citation score for the keyword search was 5648 keywords found in the results of the Food Microbiology research . Among the keywords, “FOOD” 545 times occurred, “MICROBIOLOGY” has 349 times, “GROWTH” has 285 times, “MICROBIAL” has 238 times and “DETECTION” has 192 times were occurred in the data on research output.

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