

Scientometric Portrait of Madras G Former Professor of IISc from the Chemical Engineering Domain

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Received: 07-Mar-2022, Manuscript No. IJLIS-22-56296; **Editor assigned:** 14-Mar-2022, PreQC No. IJLIS-22-56296(PQ); **Reviewed:** 28-Mar-2022, QC No IJLIS-22-56296; **Revised:** 04-Apr-2022, Manuscript No. IJLIS-22-56296(R); **Published:** 14-Apr-2022, DOI:10.35248/2231-4911.22.12.828

***Abstract-**The study undertook to know the research contribution of Dr Madras G former Scientist of IISc, Bangalore, which is one of the excellent and top institutions of India in all prospects of academics and research activities. The analysis revealed that most of the publications came in the form of (540) research articles. Most of his top-cited journals came from the US, UK and Netherlands with medium to high impact factor Journals. He was collaborative in nature with other fellow scientists with the degree of collaboration (DC) 1.00 and collaboration co-efficient (CC) 0.71. His most of authorship appearance came in 2-authored papers (216) between the duration of 1993-2020. Bose S from IISc was his highest collaborator with 41 documents. "Industrial And Engineering Chemistry Research" journal was the most used source for publication with 55 papers and the top keyword was degradation used 30 times.*

Keywords: Scientometric Portrait, Bio-bibliometrics, Degree of Collaboration, Collaboration Co-efficient.

Introduction

Basically, bib-bibliometrics or 'Scientometric portrait' analysis is a study of an individual Scientist/author who are eminent in his single discipline or core area with a set of aligned researchers contributing together throughout his/her life. Bio-bibliometrics analyse "a unit of information generation" of the individual researcher to prove great value of concern, visibility of the good scientist, who is known or lesser-known. Bio-bibliometrics visualize different quantitative aspects using analytical methods by discovering and organizing in a functional manner, where the relationship between bio-data and bio-data elements. The term 'bio-bibliometrics' was first used by (Sen, S. K., and Gan, S. K, 1990) 'informatics' by (Kalyane and Samanta, 1995) and later it was called has (Kademani et al., 1996) 'Scientometric portrait'.

Author profile

Giridhar Madras is formally known as Madras G been born on 27th September 1967 in Salem district Tamil Nadu State, India. He took his professional degree in B.E Chemical Engineering from Annamalai University in (1988), post-graduation in M.Tech Chemical Engineering, IIT Madras in (1989), and completes his PhD program from prestige's institute Texas AandM University (1993) in Chemical Engineering, His major research area focuses on reaction kinetics, as applied to various systems and processes in the "environmental and energy sector". Some of the major focus areas are:

1. Reaction with Macromolecules

2. Catalytic Reactions
3. Reactions and Separation in Supercritical Fluids.

Top honours and awards

1. Among top 1% scientists for more than 5000 citations, Web of Science
2. Shanti Swarup Bhatnagar award, CSIR, India, 2009
3. Presidential Swarna Jayanthi Fellowship, DST, India, 2006
4. Scopus Young Scientist, Elsevier, 2006
5. Fellow, Indian National Science Academy
6. Fellow, Indian National Academy of Engineering
7. Fellow, Indian Academy of Sciences
8. Associate Editor: Current Science, Bulletin of Material Science,

Related works

A study conducted by (Koley and Sen, 2016) on renowned Biobibliometrician ‘V K Kalyane’ who published a total of 120 articles with 20 single-authored papers, 100 multi-authored papers, altogether he worked with a total of 338 authors between the duration of 1973-2009. His papers covered one philosopher, 9 Nobel laureates and 17 renowned scientists; he actively collaborated with R, Prakasan, BS Kademani another stellar bibliometrician, Anil Sagar and Anil Kumar. ‘Scientometric portrait’ study was conducted by (Garg and Kumar, 2019) on agricultural scientist Hari Chand Sharma of India contingent. 45 per cent of this work was published in form of research articles, which were published in medium impacted journals from the UK, USA and Netherlands. He collaborated with more than 1000 authors of the mainstream of science though he was an agricultural scientist. His collaboration co-efficient rate was 0.66 and the collaboration rate was 1.00 for consistent years of research contribution. A Bio-bibliometrics study was conducted by (Madhu and Kannappanavar, 2020) to know the single author contribution of eminent scientist and former director of prof. P Balaram. The highlights of the study were top publications came in the form of 442 articles, top collaborations came with foreign author Karle, Isabella L, top citations occurred in “Biochemistry” journal on the topic of “Structural characteristics of alpha.-helical peptide molecules containing Aib residues” with 883 citations. (Kavitha and Chandrashekara, 2020) examined the contributions of Prof. K Byrappa of 378 articles indexed in google scholar. His h-index was 31 and received 7774 citations for this scholarly work. (Das and Bhattacharya, 2021) established a study to know the works published by Abhijit Vinayak Banerjee and Indian born American economist and shared Nobel Prize with Esther Duflo and Michael Kremer in 2019. The study of duration covered between 1987-2019 and published 333 papers.

Objective

1. To discover and differentiate his research using his published publications.
2. To evaluate the authorship pattern of his research contributions.
3. To explore the extended collaborative research performed with similar core subject specialists.
4. To examine the year-wise growth of research contribution through this prolonged research career.
5. To evaluate author appearance in each of his articles through year-wise appearance.
6. To evaluate different sources of the channel used for publishing the publications.
7. To evaluate the top-cited paper and the top author used keywords.

Methodology

The study purely concentrated on the Scientometrics Portrait of Dr Madras G scientist and former professor of IISc, Bangalore in the chemistry domain. Based on the previous literature

many renowned methods have been incorporated in this study. The data had collected from the “Scopus Citation Indexing and Abstracting” database product of ScienceDirect using author key search. The study analysed his scientific publications (540 articles) to know the types of literature published, frequency of authorship occurrence and collaboration with fellow subject authors, research publications used to publish, highly cited articles and top preferred keywords and all the data was tabled using Microsoft excel.

Productive life

Table 1 various scientific contribution has been made by Madras G in his professional and research carrier by writing in various scientific publications. Where, Table 1 describes the overall publication with a total of (569) publications in different documents format like scientific articles which are highest in total of (540) followed by Reviews (13), Conference Paper (8), Book Chapter (3), Letter (2), Editorial material (1), Note (1) and Short Survey (1) in Figure 1.

Table 1: Different Publications Forms

Sl. No.	Document type		%
1	Article	540	94.90
2	Review	13	2.28
3	Conference paper	8	1.41
4	Book chapter	3	0.53
5	Letter	2	0.35
6	Editorial	1	0.18
7	Note	1	0.18
8	Short survey	1	0.18
	Total	569	100

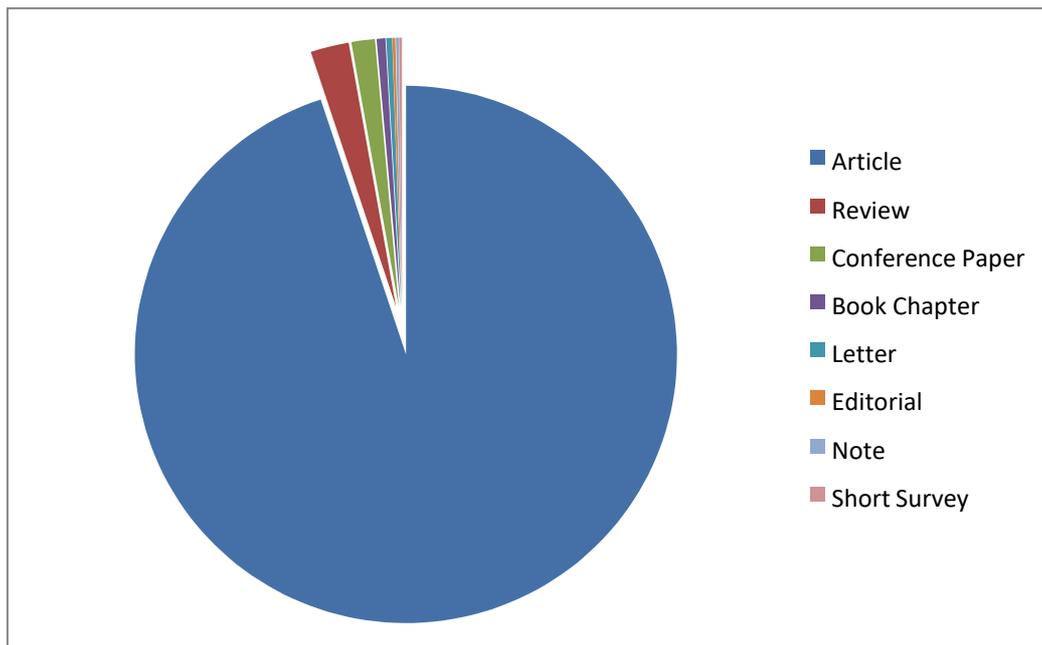


Figure-1: Authorship Pattern

Appearance of author by-line wise positions

Table 2 study had covered only the article publications that have been published by Madras. G between the periods of 1993 to 2020. His productive age started from 1993 where his biological age was 25, Table 2 displays the line-wise appearance authorship of Madras G through the year-

wise distribution of articles.

Where, as a sole author he has published only 2 (0.37%) papers between 1997-2004, has the main author in 1st position he appeared 51 (9.44%), highest contribution came as second authored appearance in 216 (40%) times, as third author 144 (26.77%) times. A total of 540 papers were published in that 53(9.81%) times he appeared as main author and 487 (90.19%) with co-authors. The highest productive year was in 2014 with 42 papers with (27.99%) average citation per paper (ACPP) were his chronological age of 46 and with the publication productivity age was 22 and highest citation appeared in 2004 with 32 papers of (89.8%) ACPP with the chronological age of 36. The degree of collaboration is 1.00 (Subramanyam, 1983) with co-authors and he is more collaborative in nature than performing in sole research.

Table 2: Year-wise and Age-wise publication productivity of Madras G

Year	SA	1 st Pos	2 nd Pos	3 rd Pos	4 th Pos	5 th Pos	6 th Pos	7 th Pos	MAT	CAT	TP	ACPP	CT	DC	CA	PPA
1993	-	2	2	-	-	-	-	-	2	2	4	46.3	4	0.04	25	1
1994	-	2		-	-	-	-	-	2	0	2	57.0	6	0.04	26	2
1995	-	1		-	-	-	-	-	1	0	1	41.0	7	0.02	27	3
1996	-	3		-	-	-	-	-	3	0	3	49.7	10	0.06	28	4
1997	1	4	1	-	-	-	-	-	5	1	6	45.2	16	0.09	29	5
1998	-	2	1	-	-	-	-	-	2	1	3	50.3	19	0.04	30	6
1999	-	1	-	-	-	-	-	-	1	0	1	35.0	20	0.02	31	7
2000	-	1	1	-	-	-	-	-	1	1	2	50.5	22	0.02	32	8
2001	-	9	6	-	-	-	-	-	9	6	15	24.8	37	0.17	33	9
2002	-	5	8	6	-	-	-	-	5	14	19	17.5	56	0.09	34	10
2003	-	7	7	8	2	-	-	-	7	17	24	46.8	80	0.13	35	11
2004	1	5	15	6	4	1	-	-	6	26	32	89.8	112	0.11	36	12
2005	-	3	6	9	-	-	-	-	3	15	18	30.2	130	0.06	37	13
2006	-	1	11	5	-	-	-	-	1	16	17	46.5	147	0.02	38	14
2007	-	5	10	3	5	1	-	-	5	19	24	60.7	171	0.09	39	15
2008	-	-	17	2	3	1	2		0	25	25	45.0	196	0.00	40	16
2009	-	-	13	4	3	2	-	-	0	22	22	63.0	218	0.00	41	17
2010	-	-	13	9	2	1	-	-	0	25	25	36.3	243	0.00	42	18
2011	-	-	13	16	5	2	-	-	0	36	36	33.4	279	0.00	43	19
2012	-	-	15	8	2	2	-	1	0	28	28	18.4	307	0.00	44	20
2013	-	-	11	7	2	1	1	1	0	23	23	27.0	330	0.00	45	21
2014	-	-	16	12	8	4	1	1	0	42	42	27.9	372	0.00	46	22
2015	-	-	8	13	8	4	2	-	0	35	35	25.9	407	0.00	47	23
2016	-	-	13	10	9	6	-	1	0	39	39	22.7	446	0.00	48	24
2017	-	-	12	14	9	5	-	-	0	40	40	15.9	486	0.00	49	25
2018	-	-	8	4	12	4	1	-	0	29	29	20.8	515	0.00	50	26
2019	-	-	8	5	6	2	-	-	0	21	21	12.9	536	0.00	51	27
2020	-	-	1	3	-	-	-	-	0	4	4	13.3	540	0.00	52	28
Total	2	51	216	144	80	36	7	4	53	487	540	-	-	1.00	-	-
%	0.37	9.44	40.00	26.67	14.81	6.67	1.30	0.74	9.81	90.19	-	-	-	-	-	-
CP	0.37	9.81	49.81	76.48	91.30	97.96	99.26	100.00	-	-	-	-	-	-	-	-

The formula for Degree of Collaboration $C = \frac{Nm}{Nm+Ns}$

Where, C=Degree of Collaboration

Nm=Number of Multi-Authored Papers

Ns=Number of Single or Sole Authored Papers

$$C = \frac{538}{538+2} \approx 1.00$$

Therefore, the degree of collaboration of Prof Madras G is 1.00 (multi-authored papers of 538 and Single authored papers of 2).

The formula for Collaboration Co-efficient $CC=1-\frac{\sum_{j=1}^K(\frac{1}{j})f_j}{N}$

F_j is the number of j author papers

N is the total number of research papers published

K is the greatest number of authors per paper.

$$=1/1)*2+1/2*51+1/3*216+1/4*144+1/5*80+1/6*35+1/7*8+1/8*4$$

$$=2+25.5+72+36+16+5.83+1.14+0.5$$

$$=158.98/540=0.294$$

$$=1-0.294 \approx \mathbf{0.71}$$

Therefore, the collaboration co-efficient of Prof Madras G is 0.71

The formula for Productive Co-efficient $P_c=\frac{\text{Chronoglogical Age of Last Publication}}{\text{Chronoglogical Age of fifty Percentage}}$

$$P_c=52/38=\mathbf{1.4}$$

Therefore, the productive co-efficient of Prof Madras G 1.0:1.4

The formula for Annual Contribution $A_{yc}=\frac{\text{Total Contribution}}{\text{Total Productive Age}}$

$$A_{yc}=540/28=\mathbf{19.29}$$

On average, he has published 18 to 19 papers yearly between 1993-2020.

Authorship appearances

Table 3 highlights the line-wise appearance of Madras G using authorship pattern, wherein 2 authored papers appeared in 1st position in 53 times, highest number times in 2nd position with 216 times, 3rd position 144 times, 4th position 80 times, 5th position 35 times, 6th position 7 times and in 8th position 5 times. When it comes to author wise paper position in 2 authored papers he has appeared 188 times this is the highest.

Table 3: Authorship Position

Authorship Pattern	1 st P	2 nd P	3 rd P	4 th P	5 th P	6 th P	7 th P	Total
Single Author	2	-	-	-	-	-	-	2
2-Author	37	151	-	-	-	-	-	188
3-Author	13	56	96	-	-	-	-	165
4-Author	1	7	43	51	-	-	-	102
5-Author	-	2	5	25	25	-	-	57
6-Author	-	-	-	4	10	3	-	17
7-Author	-	-	-	-	-	4	4	8
8-Author	-	-	-	-	-	-	1	1
Total	53	216	144	80	35	7	5	540

Collaborative authors

Table 4 discuss the top collaborative authors with Madras, G and associated with his research publications. His total published (540) with the h-index of 66, followed by highest collaborator was Bose, S from IISc, Bangalore, India (41) papers with h-index of 41, (49) papers with overseas collaborator McCoy B J from “University of California, United States” with h-index of 39, Ramamurthy P C from IISc Bangalore, India with (42) papers h-index of 28, Chatterjee, K from IISc Bangalore, India with (27) paper h-index of 32, Sivalingam G from IISc Bangalore, India with (27) papers h-index of 20, Deshpande, P A from IIT, Kharagpur India, with (24) papers h-index of 18, Hegde, M S from IISc Challakere, Chitradurga India with (24) papers with

the highest h-index of 62 within the core collaborators, Sharam M from Belgium with 22 papers with the highest h-index of 13 and Chattopadhyay S from IIR Roorkee, India with 16 papers with the highest h-index 13.

Table 4: Collaborative Authors

Sl.No	Authors	No. of papers	Affiliation Institution	h-index
1	Madras, G.	540	Indian Institute of Science Bangalore, India	66
2	Bose, S.	53	Indian Institute of Science Bangalore, India	41
3	McCoy, B.J.	49	University of California, Davis, Davis, United States	39
4	Ramamurthy, P.C.	42	Indian Institute of Science Bangalore, India	28
5	Chatterjee, K.	27	Indian Institute of Science Bangalore, India	32
6	Sivalingam, G.	27	Reliance Industries Limited, Mumbai, India	20
7	Deshpande, P.A.	24	Indian Institute of Technology Kharagpur, Kharagpur, India	18
8	Hegde, M.S.	24	Indian Institute of Science Challakere Campus, Chitradurga, India	62
9	Sharma, M.	22	KU Leuven, 3000 Leuven, Belgium	18
10	Chattopadhyay, S.	16	Indian Institute of Technology Roorkee, Roorkee, India	13

Top communication sources

Table 5 explores the top communication sources used by Madras G publishing his research work through different sources. “*Industrial And Engineering Chemistry Research*” tops the list with 55 papers between 1993-1997 with (SJR-0.878, IF-3.72, CN-UK), “*RSC Advances*” with 31 papers between 2012-2016 with (SJR-0.746, IF-3.36, CN-UK), “*Polymer Degradation And Stability*” with 28 papers between 1996-2014 with (SJR-0.925, IF-5.030, CN-UK), “*Journal of Applied Polymer Science*” with 25 papers between 2001-2013 with (SJR-0.575, IF-3.125, CN-US), the top impacted journal with (SJR-4.672, IF-19.503, CN-Netherland) “*Applied Catalysis B: Environmental*” were he published (15) papers between 2003-2018.

Table 5: Top Communication Journals

Sl. No	Title of the source	Articles	FPY	LPY	SJR (2020)	IF (2020)	Country
1	Industrial And Engineering Chemistry Research	55	1993	1997	0.878	3.72	UK
2	RSC Advances	31	2012	2016	0.746	3.36	UK
3	Polymer Degradation And Stability	28	1996	2014	0.925	5.030	UK
4	Journal of Applied Polymer Science	25	2001	2013	0.575	3.125	US
5	AICHE Journal	17	1994	2014	0.958	3.993	US
6	Applied Catalysis B: Environmental	15	2003	2018	4.672	19.503	Netherland
7	Physical Chemistry Chemical Physics	15	2003	2018	1.053	3.676	UK
8	Journal of Supercritical Fluids	14	2003	2019	0.962	4.577	Netherland
9	Chemical Engineering Journal	12	2010	2020	2.528	13.273	Netherland
10	Chemical Engineering Science	12	1997	2015	1.022	4.311	UK
11	Journal of Physical Chemistry B	11	2004	2014	0.864	2.991	Russian
12	Materials Research Express	11	2014	2017	0.383	1.610	UK
13	Journal of Physical Chemistry C	9	2007	2019	1.401	4.126	US
14	(128 Periodicals with 1-7 papers)	285	1993	2020	-	-	-
	Total	540	-	-	-	-	-

Block year

Table 6 highlights the contribution of Madras G papers in block years, where this productive year started from 1993 chronological age of 25. The paper was divided into 5 block years starting between 1993-1997 published 16 (2.963%) papers were his (CA 22-29, PA 1-5, PBY3.2%) between 1998-2002 published 40 (7.4074) papers were his (CA 30-34, PA 6-10 PBY 8%), between 2003-2007 published 115 (21.296%) papers were his (CA 35-39, PA 11-15, PBY 23%), between 2008-2012 published 136 (25.185%) papers were his (CA 40-44, PA 16-20, PBY 27.2%), between 2013-2017 published 179 (33.148%) papers were his (CA 45-49, PA 21-25, PBY 35.8%) which was his peak block years of publications, where many years' experience in research and guiding many students let to the milestone.

Table 6: Block Years

Block years	Chronological age (CA)	Productive age (PA)	No. of papers	Productivity in block years (%)	%
1993-1997	25-29	1-5	16	3.2	2.963
1998-2002	30-34	6-10	40	8	7.4074
2003-2007	35-39	11-15	115	23	21.296
2008-2012	40-44	16-20	136	27.2	25.185
2013-2017	45-49	21-25	179	35.8	33.148
2018-2020	50-52	26-28	54	18	10
Total			540		100

Authorship status

Table 7 analyse authorship appearance differentiate between Non-collaborative and collaborative authorship in research publications. Where Non-collaborative papers were 2 individual publications of Madras G and further his collaborative papers 51 with two authored papers, 216 papers with three authored papers which were the highest in the table. Four authored papers of 144 papers, five authored papers of 80 papers, six authored papers of 35 papers, seven authored papers of 8 papers and eight six authored papers of 4 papers.

Table 7: Authorship Non-Collaborative and Collaborative

Authorship	Single	Two	Three	Four	Five	Six	Seven	Eight	Total
Non-Collaborative	2		-	-	-	-	-	-	2
Collaborative	-	51	216	144	80	35	8	4	538

Time span

Table 8 portrays the life span of the duration of years of authorship appearance. The top contributions came in three authored papers between the period of 1993-2020 of 216 papers within a span of 28 years and the second top contribution came in 4 authored papers in 144 papers time of span 2002-2020 within a span of 18 years.

Table 8: Production Years

No. of Author	Single	Two	Three	Four	Five	Six	Seven	Eight
No of Papers	2	51	216	144	80	35	8	4
Time Span	1997-2004	1993-2007	1993-2020	2002-2020	2004-2019	2004-2019	2008-20018	2012-2016
Years	8	15	28	18	16	16	11	5

Keywords

Table 9 discuss the top keywords used by Madras G in publications are listed out. Degradation was the top keyword with occurrences of (30), times, followed by continuous distribution kinetics (23) times, photocatalysis (22) times, combustion synthesis (16) times, supercritical carbon dioxide (16) times.

Table 9: Productive Keywords

Sl. No.	Keywords	No. of Occurrences
1	Degradation	30
2	Continuous distribution kinetics	23
3	Photocatalysis	22
4	Combustion synthesis	16
5	Supercritical carbon dioxide	16
6	Kinetics	12
7	Supercritical fluids	12
8	Dye degradation	11
9	Adsorption	10
10	Co oxidation	10
11	Distribution kinetics	10
12	Thermal degradation	10
13	Biodegradable polymers	9
14	Photocatalytic degradation	9
15	Solubilities	9
16	Association model	8
17	Ultrasound	8
18	Copolymers	7
19	Ostwald ripening	7
20	Rate coefficients	7

Top cited articles

Table 10 displayed top-cited papers of Madras G. The top-cited paper came in the year 2014 with the title of “Structure and photo catalytic activity of $Ti_{1-x} M_x O_2 \pm \delta$ (M=W, V, Ce, Zr, Fe, and Cu) synthesized by solution combustion method” in “The Journal of Physical Chemistry B” citations of 505 times with, followed by in 2004 on the title of “Synthesis and structure of Nano crystalline TiO_2 with lower band gap showing high photo catalytic activity” in “Langmuir Journal” with citations of 471 times. The Top IF (19.503) paper came from Nagaveni, K., Siva lingam, G., Hegde, M. S., and Madras, G. (2004). “Solar photo catalytic degradation of dyes: high activity of combustion synthesized Nano TiO_2 ”. “Applied Catalysis B: Environmental, 48(2), 83-93” from US publication.

Table 10: Top Citations

Sl. No.	Citation of the documents	No of times cited	IF	Country
1	Nagaveni, K., Hegde, M. S., and Madras, G. (2004). Structure and photocatalytic activity of $Ti_{1-x} M_x O_2 \pm \delta$ (M=W, V, Ce, Zr, Fe, and Cu) synthesized by solution combustion method.	505	2.991	US
2	Nagaveni, K., Hegde, M. S., Ravishankar, N., Subbanna, G. N., and Madras, G. (2004). Synthesis and structure of nanocrystalline TiO_2 with lower band gap showing high photocatalytic activity.	471	3.882	US

3	Nagaveni, K., Sivalingam, G., Hegde, M. S., and Madras, G. (2004). Solar photocatalytic degradation of dyes: high activity of combustion synthesized nano TiO ₂ .	351	19.503	Netherlands
4	Sivalingam, G., Nagaveni, K., Hegde, M. S., and Madras, G. (2003). Photocatalytic degradation of various dyes by combustion synthesized nano anatase TiO ₂ .	348	19.503	Netherlands
5	Madras, G., Kolluru, C., and Kumar, R. (2004). Synthesis of biodiesel in supercritical fluids.	327	6.88	Netherlands
6	Nagaveni, K., Sivalingam, G., Hegde, M. S., and Madras, G. (2004). Photocatalytic degradation of organic compounds over combustion-synthesized nano-TiO ₂ .	274	7.864	US
7	Hegde, M. S., Madras, G., and Patil, K. C. (2009). Noble metal ionic catalysts.	266	22.38	US
8	Mahata, P., Madras, G., and Natarajan, S. (2006). Novel photocatalysts for the decomposition of organic dyes based on metal-organic framework compounds.	258	2.991	US
9	Radhakrishnan, S., Siju, C. R., Mahanta, D., Patil, S., and Madras, G. (2009). Conducting polyaniline–nano-TiO ₂ composites for smart corrosion resistant coatings.	250	6.215	UK
10	Kundu, P., Nethravathi, C., Deshpande, P. A., Rajamathi, M., Madras, G., and Ravishankar, N. (2011). Ultrafast microwave-assisted route to surfactant-free ultrafine Pt nanoparticles on grapheme: synergistic co-reduction mechanism and high catalytic activity.	238	9.811	US

Key findings

1. The top research outcome of Madras G came in the form of (540) articles. Where sole published only (0.47) 2 papers between 1997-2004. As the main author he appeared in (9.81%) 53 papers and with multi-authors (90.19%) 487 papers. The highest contribution came as second authored appearance in (40%) 216 papers duration 1997-2020.
2. The highest productive year was 2014 where he published 42 papers with (27.99%) average citation per paper (ACPP) were his chronological age was 46 and his publication productivity age was 22. The highest citations appeared in 2004 with 32 papers of ACPP of (89.8%) were his chronological age was 36.
3. The degree of collaboration was 1.00 and collaboration co-efficient is 0.71 with co-authors. He was more collaborative in nature of work than performing in sole research. This productive co-efficient was 1.4 and annual he contributed on an average of (19.29%) 18-19 papers.

Results and Discussion

The highest collaborator was Bose, S from IISc, Bangalore, India (41) papers with h-index of 41 and with overseas collaborator McCoy B J from “University of California, United States” with h-index of 39. The top source came from “Industrial and Engineering Chemistry Research” with 55 papers between 1993-1997 with (SJR-0.878, IF-3.72, CN-UK) in “Applied Catalysis B: Environmental” where he published (15) papers between 2003-2018. The top impacted journal with (SJR-4.672, IF-19.503, CN-Netherlands) “Applied Catalysis B: Environmental” where he published (15) papers between 2003-2018. His peak block years of publications were 2013-2017; he published (33.148%) 179 papers were his (CA 45-49, PA 21-25, PBY 35.8%). The top collaborative pattern was 216 papers with three authored papers with a time span of 1993-2020 in 28 years. The top-cited paper came in the year 2014 with the title of “Structure and photocatalytic activity of Ti_{1-x}M_xO₂ ± δ (M=W, V, Ce, Zr, Fe, and Cu) synthesized by solution combustion method” in “The Journal of Physical Chemistry B” with citations of 505 times. The

Top IF (19.503) with citations 351 came from” Synthesis and structure of Nano crystalline TiO₂ with lower band gap showing high photo catalytic activity” Langmuir Journal from US publication. The top keywords used by Madras. G in his publications was ‘degradation’ (30) times.

Conclusion

Scientometric studies are very important in highlighting the single scientists profile, achievement, awards, research publications and etc. Performed by a single author throughout his prolonged career with the association of different institutions, authors and communication channels. As an eminent scientist and professor, Madras G has contributed excellent work in this domain and is honoured with many awards. He guided many students and scholars throughout his life. Based on his research publications he was more collaborative in his work, compared to other scientists he was more collaborative with Indian author’s par with foreign authors. His h-index is 66, where got more than 5000 citations and is one of the top third productive authors of IISc, Bangalore.

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