

SCIENTOMETRIC ANALYSIS OF BIOMASS RESEARCH OUTPUT DURING 2014 -2018

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Abstract: *The study investigates that the Scientometric Analysis of Biomass Research Output During 2014 -2018 and collected from the data were the Institute of Electrical and Electronics Engineers database. Today all are using the different energy sources and Biomass as one of energy in recent years. The study results of the total number of 1739 records are found in the five years period. The majority of the Conferences, 1472 (84.65%), author wise found the Stefano Tebaldini, 22(12.65%) as the top most level and Affiliation of Biomass Research at Chalmers University of Technology, Gothenburg, Sweden has 10 records (0.57%).*

Key Words: *Biomass, Scientometric study and IEEE Database.*

1. INTRODUCTION:

Scientometrics is known as a science of sciences. It has gained significance for the simple reason that it is not merely a theoretical discipline, but has extensive applications and the quantitative analysis of science and its outputs. Biomass is an energy source getting by burning wood, crop waste, garbage, etc. Biomass is an organic material that comes from plants and animals. As an energy source, biomass can either be used directly via combustion to produce heat, or indirectly after converting it to various forms of biofuel. Conversion of biomass to biofuel can be achieved by different methods which are broadly classified into thermal, chemical, and biochemical. Biomass power is carbon neutral electricity generated from renewable organic waste that would otherwise be dumped in landfills, openly burned, or left as fodder for forest fires. When burned, the energy in biomass is released as heat.

In the recent several years, the fossil energy has been exhausted, and the biomass energy has been the fourth largest energy source. As an advanced thermos chemistry, transformation method, the technology of biomass gasification in fluidized bed could utilize biomass efficiently For most normal biomass, there is a certain content of inorganic mineral composition such as K, Na, S, P and so on, besides of organic component as C, H, O. Hence, in the processes of transformation, the residual inorganic mineral composition is called ash.

2. OBJECTIVES OF THE STUDY :

The present study has the following objective of this study are below:

- To analyze the document wise Biomass Research outputs during 2014 to 2018
- To carry out an Author wise Biomass Research Output
- To category of Affiliation
- To assess the Publication Title
- Analyzing the Publisher category and
- To find out the Conference Location

3. REVIEW OF LITERATURE:

Nair *et.al.*, (2019) carried out a study on “A Scientometric Assessment of Renewable Biomass Research Output in India.” It provides a quantitative assessment of the scientific literature for mapping the intellectual structure of Renewable Biomass research in India. The study period has 20 years during 1999 to 2018. The study finds out, the result of a total of 691 publications and top cited and downloaded papers, citation patterns, most frequent topic clusters, and keywords, and social mentions by country, discipline, and professional status. It has highlighted some areas of improvement in this field of study. This study also reveals a lot of well-established topics which are changing gradually with impact on citations and downloads. Statistical models and analysis give the result that the field is predominantly influenced by fundamental and highly recognized scientists and papers. The analysis was conducted using HistCite software.

Murugan.K. (2019) published an article “An ‘Eye Disease’ Research Output during 2009-2018: Scientometric Study.” The recent years as using scientometric analysis for determining scientific trends in journal

collaboration and growth. The present study has collected the data were PubMed database using the Keyword search an Eye disease from 2009 to 2018. It is found that the total number of 165,083 records are eye diseases during 2009 to 2018. The most of the accurate records are found in 2015, 19264 (11.66%), the Female, 42466 (61.23%) is more, an article types publication of rare eye diseases are naturally majority of the case reports and Classical Articles are same category (49.27%), totally 9,717 documents are exposed in the journal category, In 2014, 5350 (12.04%) are top most level of Species - Human and majority of the records are scientifically derived from an AIDS 28469 (97.38%). The present study has in common an eye disease. It is number of records are found in a number of females, year reasonable an article type's publication of eye diseases are the majority of the case reports and Classical Articles are in the study.

Salinas et.al., (2018) investigated on "A Scientometric Analysis of The Investigation of Biomass Gasification Environmental Impacts from 2001 to 2017." It is to reduce the effects of climate change due to massive CO₂ emissions, renewable energy sources have been implemented; among them biomass through gasification. The study shows that are the environmental impacts of this process. Therefore, a search was made in the database of the science website using keywords gasification environmental impact in the period from 2001 to 2017. When analyzing the 238 articles, an increasing tendency was observed in the publication of studies related to the ecological effects of the above process. The United States, the United Kingdom, Italy, Spain and the People's Republic of China are the countries that have the most studies on the subject.

Murugan and Ravi. (2016) presented a paper on "A study in SCImago Journal and Country Ranking list of Top 50 Ranking Journals of Library and Information Science." The study to find out the top most journals in the field of Library and Information Science. The SCImago Journal and Country Ranking were used to identify the top 50 Journal Publications. The journal Information Systems Research gets the first place with the SCImago Journal and Country Rank 4.397 and h-index number 116 (5.50%). The year of 2015 cited the Documents of the journal of IEEE Transactions on Information Theory 447 (13.20%), the total documents wise in the IEEE Transactions on Information Theory 1583 as top most level, observed the Journal of Chemical Information and Modeling are high level (14035) and IEEE Transactions on Information Theory are top most Level (4200). The Continent level United States are high level in the first rank.

3.1 THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

An IEEE Xplore is a research database for using the online resources on electrical and electronics, communication, computer science and allied to related field of technology. Access to journal articles, technical standards, conference proceedings, etc. The more than 4,562,957 records are as an April 2018.

4. METHODOLOGY

The present study data were collected from the IEEE database of Keyword search in Biomass. The Biomass Research contribution published and selected during 2014 to 2018 among the five - year periods only.

5. ANALYSIS OF DATA:

Table.1. Document wise Biomass Research output

S.No	Documents	Documents	Percentage
1	Conferences	1472	84.65
2	Journals	232	13.35
3	Books	22	1.26
4	Magazines	13	0.74
Total		1739	100.00

In table.1 explained the document wise Biomass research output during 2014 to 2018. Out of 1739 documents, the most of the Conferences, 1472 (84.65%) and followed by Journals, 232 (13.35%), Books, 22(1.26%) and magazines, 13 (0.74%).

Table.2 Author wise Biomass Research Output

S.No	Authors	Records	Percentage of 1739
1	Stefano Tebaldini	22	12.65
2	Thuy Le Toan	18	10.35
3	Irena Hajnsek	18	10.35
4	Lars M. H. Ulander	18	10.35
5	N. Altawell	14	8.05
6	Zengyuan Li	14	8.05
7	Guoqing Sun	14	8.05

8	Erxue Chen	12	6.90
9	Dinh Ho Tong Minh	12	6.90
10	Shaun Quegan	12	6.90
11	Maciej J. Soja	11	6.32
12	T. Le Toan	11	6.32
13	Sergiu Caraman	11	6.32
14	Fabio Rocca	10	5.75
15	Mehrez Zribi	10	5.75
16	Konstantinos P. Papathanassiou	9	5.17
17	Temilola Fatoyinbo	9	5.17
18	Kamal Sarabandi	9	5.17
19	Yong Yan	9	5.17
20	Ludovic Villard	9	5.17
21	Nicolas Baghdadi	9	5.17
22	Simonetta Paloscia	9	5.17
23	Matteo Pardini	9	5.17
24	Manabu Watanabe	8	4.60
25	Nazzareno Pierdicca	8	4.60

It is evident from the table 3 that an author wise Biomass research output. Out of 1739, an author wise found the Stefano Tebaldini, 22 (12.65%) as the topmost level. Author Thuy Le Toan, Irena Hajnsek and Lars M. H. Ulander, 18 (10.35%), N. Altawell, Zengyuan Li and Guoqing Sun, 14(8.05%), Erxue Chen, Dinh Ho Tong Minh and Shaun Quegan, 12(6.90%), Maciej J. Soja, T. Le Toan and Sergiu Caraman, 11 (6.32%), Fabio Rocca and Mehrez Zribi, 10(5.75%) and eight authors are different category, 9 (5.17%) and two authors are 8 (4.60%).

Table.3 Affiliation of Biomass Research

S.No	Affiliation	Records	Percentage of 1739
1	Chalmers University of Technology, Gothenburg, Sweden	10	0.57
2	IRSTEA, UMR TETIS, Montpellier, France	8	0.46
3	CESBIO, Toulouse, France	6	0.34
4	University of Pittsburgh	5	0.28
5	University of Johannesburg, P O Box 524, Auckland Park 2006, South Africa	5	0.28
6	Johns Hopkins University	5	0.28
7	Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA	5	0.28
8	University of Glasgow	4	0.23
9	Alternate Hydro Energy Centre, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247667, India	4	0.23
10	College of William & Mary	4	0.23
11	State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing, China	4	0.23
12	Department of Renewable Energy, Rajasthan Technical University, Kota, India	4	0.23
13	Politecnico di Milano, Milan, Italy	4	0.23
14	Mechanical Engineering Department, De La Salle University, Manila, Philippines	4	0.23
15	IFAC-CNR, Florence (Italy)	4	0.23
16	School of Control and Computer Engineering, North China Electric Power University, Beijing, China	4	0.23
17	Department of Geographical Sciences, University of Maryland, College Park, MD 20742, USA (4	0.23

18	Department of Electrical Engineering, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247667, India	4	0.23
19	IFAC-CNR, via Madonna del Piano 10, 50019 Sesto Fiorentino (Florence) - Italy	3	0.17
20	National Engineering Laboratory for Biomass Power Generation Equipment, North China Electric Power University, Beijing, China	3	0.17
21	University of Michigan, Radiation Laboratory, 1301 Beal Avenue, Ann Arbor, 48109, USA	3	0.17
22	Department of Applied Electronics, Technical University of Cluj-Napoca, Cluj-Napoca, Romania	3	0.17
23	German Aerospace Center (DLR) - Microwave and Radar Institute - Wessling (Germany)	3	0.17
24	IRSTEA, UMR TETIS, 34093 Montpellier Cedex 5, France	3	0.17
25	Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, Yiheyuanhou, 100091, Beijing, P.R. China	3	0.17

In Table 3 indicates that an Affiliation of Biomass Research. The study found that an Affiliation the highest number of Chalmers University of Technology, Gothenburg, Sweden has 10 records (0.57%). An IRSTEA, UMR TETIS, Montpellier, France, 8(0.46%), CESBIO, Toulouse, France, 6(0.34%), University of Pittsburgh, University of Johannesburg, P O Box 524, Auckland Park 2006, South Africa, Johns Hopkins University and Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA, 5(0.28%), from a University of Glasgow to Department of Electrical Engineering, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247667, India, 4(0.23%), from IFAC-CNR, via Madonna del Piano 10, 50019 Sesto Fiorentino (Florence) - Italy to Institute of Forest Resource Information Techniques, Chinese Academy of Forestry, Yiheyuanhou, 100091, Beijing, P.R. China, 3 records (0.17%).

Table.4 Rank wise Publication Title

Publication Title	Records	% of 1739	Rank
IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing	80	4.60	1
IGARSS 2018 - 2018 IEEE International Geosciences and Remote Sensing Symposium	72	4.14	2
2016 IEEE International Geosciences and Remote Sensing Symposium (IGARSS)	54	3.10	3
2015 IEEE International Geosciences and Remote Sensing Symposium (IGARSS)	53	3	4
2017 IEEE International Geosciences and Remote Sensing Symposium (IGARSS)	49	2.81	5
IEEE Transactions on Geosciences and Remote Sensing	48	2.76	6
2014 IEEE Geosciences and Remote Sensing Symposium	47	2.70	7
IEEE Geosciences and Remote Sensing Letters	23	1.32	8
2014 International Conference and Utility Exhibition on Green Energy for Sustainable Development (ICUE)	20	1.15	9
IET Nanobiotechnology	15	0.86	10
The Selection Process of Biomass Materials for the Production of Bio-Fuels and Co-firing	14	0.8	11
EUSAR 2014; 10th European Conference on Synthetic Aperture Radar	11	0.63	12
IEEE Transactions on Plasma Science	11	0.63	13
7th Brunei International Conference on Engineering and Technology 2018 (BICET 2018)	10	0.57	14
EUSAR 2018; 12th European Conference on Synthetic Aperture Radar	10	0.57	15
2014 5th International Renewable Energy Congress (IREC)	9	0.5	16

2016 IEEE International Conference on Functional-Structural Plant Growth Modeling, Simulation, Visualization and Applications (FSPMA)	9	0.5	17
2017 IEEE/OES Acoustics in Underwater Geosciences Symposium (RIO Acoustics)	9	0.5	18
2018 International Conference and Utility Exhibition on Green Energy for Sustainable Development	9	0.5	19
4th IET Clean Energy and Technology Conference (CEAT 2016)	9	0.5	20
IET Renewable Power Generation	9	0.5	21
Proceedings of EUSAR 2016: 11th European Conference on Synthetic Aperture Radar	9	0.5	22
2014 The Third International Conference on Agro-Geoinformatics	8	0.46	23
2015 19th International Conference on System Theory, Control and Computing (ICSTCC)	8	0.46	24
2014 3rd International Conference on the Developments in Renewable Energy Technology (ICDRET)	7	0.4	25

The study found that the table 4 shows that the Rank wise Publication Titles. Out of 1739, the top most level an IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 80 (4.60%) occupied the first rank and followed by IGARSS 2018 - 2018 IEEE International Geo sciences and Remote Sensing Symposium, 72(4.14%) ranked as second, 2016 IEEE International Geo sciences and Remote Sensing Symposium (IGARSS), 54 (3.10%) are third rank, 2015 IEEE International Geo sciences and Remote Sensing Symposium (IGARSS), 53 (3%) as fourth rank, 2017 IEEE International Geo sciences and Remote Sensing Symposium (IGARSS), 49(2.81%) ranked as fifth, IEEE Transactions on Geo sciences and Remote Sensing, 48(2.76%) ranked as sixth, 2014 IEEE Geo sciences and Remote Sensing Symposium, 47(2.70%) ranked as seventh and 2014 3rd International Conference on the Developments in Renewable Energy Technology (ICDRET) ranked as 25th place.

Table.5.Distribution of the Publisher

S.No	Publisher	Records	Percentage of 1739
1	IEEE	1640	94.32
2	Institute of Engineering & Technology	62	3.56
3	VDE	32	1.84
4	MITP	5	0.28

Table.5 explained that the distribution of the Publisher. It is found that the top most level an IEEE, 1640 (94.32%) followed by the Institute of Engineering & Technology, 62 (3.56%), VDE, 32 (1.84%) and MITP, 5 (0.28%).

Table.6.Distribution of the Conference Location

S.No	Conference Location	Records	Percentage of 1739
1	Beijing	77	4.42
2	Valencia	73	4.20
3	Milan	57	3.30
4	Fort Worth, TX	49	2.80
5	Quebec City, QC	47	2.70
6	Dhaka	27	1.55
7	Cape Town	26	1.50
8	Hammamet	21	1.20
9	Pattaya	20	1.00
10	Singapore	20	1.00
11	Kuala Lumpur	17	0.97
12	Chennai	16	0.92
13	Rio de Janeiro	16	0.92
14	San Jose, CA	15	0.86

15	Coimbatore	14	0.80
16	Iasi	14	0.80
17	Palermo	13	0.70
18	Rome	13	0.70
19	Berlin, Germany	11	0.60
20	Aachen, Germany	10	0.50
21	Bandar Seri Begawan, Brunei	10	0.50
22	Beirut	10	0.50
23	Shanghai	10	0.50
24	Changsha	9	0.50
25	Cluj-Napoca	9	0.50

It is seen from the table.6 shows that the distribution of the Conference Location. Out of 1739, found that the Beijing, 77 (4.42%) followed by Valencia, 73(4.20%), Milan, 57 (3.30%), Fort Worth, TX, 49 (2.80%), Quebec City, QC, 47 (2.70%), Dhaka, 27(1.55%), Cape Town, 26(1.50%), Hammamet,21(1.20%), Pattaya and Singapore, 20 (1%), Chennai and Rio de Janeiro, 16 (0.92%), San Jose, CA, 15 (0.86%), Coimbatore and Iasi, 14(0.80%), Palermo and Rome, 13(0.70%), Berlin, Germany, 11 (0.60%), Aachen, Germany, Bandar Seri Begawan, Brunei, Beirut and Shanghai, 10 (0.50%), Changsha and Cluj-Napoca, 9 (0.50%) are very less.

Table.7. Rank Wise Index Term

Index Term	Records	Percentage of 1739	Rank
Biofuel	264	15.18	1
Vegetation	249	14.31	2
Remote sensing by radar	218	12.53	3
Synthetic aperture radar	216	12.42	4
Vegetation mapping	205	11.80	5
Renewable energy sources	202	11.61	6
Bioenergy conversion	195	11.21	7
Renewable materials	141	8.10	8
Forestry	132	8.00	9
Distributed power generation	117	6.44	10
Crops	112	6.40	11
Remote sensing	112	6.40	12
Microorganisms	110	6.32	13
Radar polarimetry	91	5.23	14
Soil	90	5.17	15
Power generation economics	88	5.00	16
Geophysical techniques	83	4.70	17
Hybrid power systems	79	4.50	18
Radar interferometry	78	4.50	19
Optical radar	74	4.20	20
Photovoltaic power systems	74	4.20	21
Remote sensing by laser beam	74	4.20	22
Geophysical image processing	72	4.10	23
Sustainable development	70	4.00	24
Bioreactors	67	3.80	25

In table.7 reveals that the rank wise Index Term of the using the Biomass research. It is found that the Biofuel, 264 records (15.18%) occupied as a first position. The Vegetation has second ranked, 249 (14.31%), Remote sensing by radar, 218(12.53%) as third position, Synthetic aperture radar, 216 (12.42%) as fourth position, Vegetation mapping, 205 (11.80%) as fifth place, Renewable energy sources, 195 (11.21%) as seventh position, Renewable materials, 141(8.10%) as eighth position, Forestry, 132 (8%) as ninth position and Distributed power generation, 117 (6.44%) as tenth position and Bioreactors are 25th position of the Biomass research.

6. CONCLUSION:

The study concludes that the Biomass research output during 2014 to 2018 and the number of papers indexed by IEEE database. The present study as a result shows that the highest number of published in the conference, the author of Stefano Tebaldini has highest contributed paper in biomass, Publication Title an IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing and are occupied as a first rank, the most of the published papers are IEEE and first position of the rank wise Index term has Biofuel.

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