



## SCIENTOMETRIC ANALYSIS ON POLLUTION CONTROL

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### ABSTRACT :

**W**ith a desire to see the responsibility of the global scientists concern towards a pollution free society, literatures related to the "Pollution Control" for 10 years has been downloaded from the electronic database "Web of Science" from 2007 to 2016. Appropriate objectives are framed and the techniques of scientometric are applied. To identify the relationship between variable of the year wise data, regression test has been applied. The year wise increment of the publications are retrieved. The language wise and country wise publications are found out. The doubling time of the records are calculated. The article is concluded with a request to MHRD to allocate more funds for the researchers to do many more research to control the pollution to develop a pollution free society.

**KEYWORDS** : Scientometric – Pollution Control – Regression – Doubling Time.

### I. INTRODUCTION

The natural calamities and drastic changes in the environment and fast growing industries leads to enormous pollution in the society. The green environment of the society surpassed with chemical

substances in the contemporary mechanical life. Though the ministry of each and every government laid policy to segregate the organic and in-organic wastages to prevent and preserve the environment from pollution, the increasing growth of wastages makes it vain. Not only the wastages, but also the chemical extract from the factories, smoke that emanates from industrial area as well as from the ever growing vehicles leads to pollute the water and air. The global society deteriorates from day to day and the life time of the living beings are increasingly reduced. The daily news of mass media communication also reveals the fact of deterioration of goodness of the society. Therefore, awareness is very much essential to control the pollution in order to enhance hale and healthy society. This article is to enlighten the society about the response of the global scientists towards the control of pollution because these are the literatures, which are equal to the life saving drugs. Literatures related to the contributory role of the bibliometricians are reviewed. Appropriate hypothesis and objectives are framed to assess and analyze the number of literatures published and indexed in the database "Web of Science". The deviations between the year wise numbers of publications are calculated with regression statistical test to pacify the platform for predicting the doubling time of the literatures. Language wise publications and top ten country wise publications are also analyzed. It is recommended that each and every ministry of Human Resource Development to encourage researcher to promote more research on Pollution Control to save the living beings of this society.

### II. REVIEW OF LITERATURE

The scientometric study on International Journal of Remote Sensing during the year 2006-2015, reveals the 10 years of literature growth, types of literatures published in the journal, authorship pattern, cited references and institution wise publications. The data has been downloaded from Web of Science. It is inferred that the number of publications increased from year after year till 2015 and after 2015 the publications declined. The study also reveals the contribution of difference countries

towards the journal. 1 It was identified that a total of 54373 numbers of publications were published in the MEDLINE database for the period from 1999 to 2008. USA contributes more number of publications. It was further found that 88.52% of the publications were published in English language. The type of publications is dominated by the Journal articles with 75.27%. The doubling time of the records was assessed by the researcher. It was also identified that the journal entitled "Blood" published more number of publications on "Stem Cell" with 971 publications. At the overall the article reveals a complete bibliometric statistics about the publications on "Stem Cell".<sup>2</sup> The data has been downloaded from SCOPUS database from the year 1965 to 2010 on the literature output related to different crops for the bibliometric analysis. It was identified that more number of publications published on rice. Agricultural Universities and institutions functioning under ICAR publishes more number of publications. At the outset, the multi-authored papers played pre-dominant role over the solo publications.<sup>3</sup> The data on Pollution Control was downloaded from the database "SCOPUS" for twenty five years from the year 1991 to 2015. The objectives of the article was to assess the total number of publications published on Pollution Control, to find out the doubling time of the records, to know the literature type of Indian contribution and authorship pattern. It was found that a total number of 52575 publications were published during the above stated years. It was further assessed that the doubling time of records will be 8.53 years. Journal Article was the majority of the publications. The multi-authored papers are more than the single authored papers. Indian Institute of Technology, Kharagpur published more number of publications.<sup>4</sup>

### III. OBJECTIVES

- + To find out the year wise growth of the literature
- + To find out the deviation between the year wise growth of the literature
- + To assess the type of literatures involved in publications
- + To know the language wise publications
- + To know the doubling time of the records
- + To assess the country wise publications

### IV. HYPOTHESIS

$H_0$ : There is no significant relationship between the first half of the number publications and the second half of the number of publications.

### V. METHODOLOGY

Literatures published on Pollution Control and indexed in Web of Science from 2007 to 2016 have been downloaded for the research work. The downloaded data are segregated and tabulated to fulfill the prescribed objectives. Appropriate statistical tool has been applied to test the hypothesis framed.

### VI. ANALYSIS AND INTERPRETATION

#### VI.1. YEAR WISE PUBLICATIONS

The literatures on Pollution Control from 2007 to 2016 leads to a record count of 17791 publications. It is crystal clear that the percentage analysis is in increasing trend. Every year after year the number of publications on Pollution Control increases, which proves that the global scientists are more concern about controlling the Pollution. The ten years of literature are divided into two parts to test the deviation among the publications. Therefore, regression test is applied to analyse the relationship between the first half of the publications and second half of the publications. The test reveals that the deviation among the number of publications are very low and the relationship is very high 92%.

YEAR	RECORDS	PERCENTAGE ANALYSIS
2007	1151	6.47
2008	1291	7.26
2009	1436	8.07
2010	1489	8.37
2011	1625	9.13
2012	1717	9.65
2013	1882	10.58
2014	2001	11.25
2015	2331	13.10
2016	2868	16.12
<b>TOTAL</b>	<b>17791</b>	<b>100</b>

*Regression Statistics*

Multiple R	0.929135448
R Square	0.863292682
Adjusted R Square	0.817723575
Standard Error	78.05831067
Observations	5

*Coefficients P-value*

Intercept	592.6214459	0.051435781
X Variable 1	0.373080171	0.022403009

Table 1: Yearwise Publications on Pollution Control

Since the P-value of 0.05 is equal to the critical value of 0.05, the null hypothesis is rejected. Therefore it is inferred that there is relationship between the first half of the number of publications and the second half of the publications. Further, the statistical test is a firm platform to assess the doubling time of the publications.

VI.2. DOCUMENT WISE PUBLICATIONS

SL. NO.	DOCUMENT TYPE	RECORDS	PERCENTAGE ANALYSIS
1	Article	15917	89.47
2	Review	1020	5.73
3	Article; Proceedings Paper	612	3.44
4	Editorial Material	122	0.69
5	Meeting Abstract	25	0.14
6	Review; Book Chapter	25	0.14
7	Article; Book Chapter	22	0.12
8	News Item	21	0.12
9	Letter	9	0.05
10	Book Review	8	0.04
11	Correction	5	0.03
12	Article; Retracted Publication	2	0.01
13	Reprint	2	0.01
14	Chronology	1	0.01
<b>TOTAL</b>		<b>17791</b>	<b>100</b>

Table2: Document wise Publications on Pollution Control

The table number 2 shows the different types of publications involved towards disseminating the research output on Pollution Control, worldwide. Totally, 14 types of publications were published on Pollution Control according to the database Web of Science. The Journal article plays dominant role with an article count of 15917(89.47%) among the other types of publications. Review is in the second place with a count of 1020 (5.73%) and the papers published in the proceedings is placed in the third place with a record count of 612 (3.44%). But the difference between the number of articles which is in the first place and the second place is abundant.

### VI.3. LANGUAGE WISE PUBLICATIONS

The above cited table number 3 denotes that the language "English" is involved in publishing majority of the number of publications on Pollution Control with a record count of 17354(97.54%). The second place and third place is shared by Spanish and Portuguese with a record count of 104(0.58%) and 66(0.37%), respectively. At the outset, twenty four countries were involved towards publishing the overall publications of 17791.

SL. NO.	LANGUAGE	RECORDS	PERCENTAGE ANALYSIS
1	English	17354	97.54
2	Spanish	104	0.58
3	Portuguese	66	0.37
4	Chinese	59	0.33
5	French	57	0.32
6	Polish	36	0.20
7	German	28	0.16
8	Turkish	18	0.10
9	Italian	14	0.08
10	Russian	14	0.08
11	Croatian	6	0.03
12	Czech	6	0.03
13	Serbo-Croatian	6	0.03
14	Japanese	4	0.02
15	Slovene	4	0.02
16	Malay	3	0.02
17	Catalan	2	0.01
18	Hungarian	2	0.01
19	Korean	2	0.01
20	Serbian	2	0.01
21	Arabic	1	0.01
22	Lithuanian	1	0.01
23	Persian	1	0.01
24	Ukrainian	1	0.01
TOTAL		17791	100.00

Table 3: Language wise publications on Pollution Control

VI.4. DOUBLING TIME OF THE RECORDS

YEAR	RECORDS	CUMULATIVE RECORDS	W1	W2	R(P) = W2 - W1	NO. OF DAYS
2007	1151	1151	7.05	7.05	0.00	
2008	1291	2442	7.16	7.80	0.64	252
2009	1436	3878	7.27	8.26	0.99	
2010	1489	5367	7.31	8.59	1.28	
2011	1625	6992	7.39	8.85	1.46	
2012	1717	8709	7.45	9.07	1.62	
2013	1882	10591	7.54	9.27	1.73	141
2014	2001	12592	7.60	9.44	1.84	
2015	2331	14923	7.75	9.61	1.86	
2016	2868	17791	7.96	9.79	1.83	

Table 4: Doubling Time of Records

VI.5. TOP 10 COUNTRY WISE PUBLICATIONS

COUNTRY	NO. OF PUBLICATIONS	RANKING
Peoples R China	4158	1
USA	4158	1
UK	1128	2
India	1013	3
Spain	888	4
Italy	866	5
France	782	6
Canada	771	7
Germany	686	8
Japan	487	9

Table 5: Top 10 Country wise Publications

The table no.5 cited above is about the country wise publications on Pollution Control. The table also reveals that China and United States of America shared the first place with 4158 number of publications leaving the second place to United Kingdom with a record count of 1128 publications. India placed in the third place towards publishing more number of publications on "Pollution Control".

VII. CONCLUSION

The study has been conducted to give awareness about the pollution and the response of the global scientists towards controlling the pollution. The ten years of study proves that the number of publications on "Pollution Control" increases from day by day. The regression test proves that there are relationship between the first half of the number of publications and the second half of the number of publications. Out of fourteen types of documents, the articles published in journals plays the majority role with a count of 15917(89.47%). It is inferred that twenty four types of languages are involved towards the publications on "Pollution Control" and English language dominates the other type of the language publications. The doubling time of records of the second five years is decreased than the first five years, which proves that the publications increase from day to day. China and United States of America shares the first place towards publishing more number of publications. The second place is occupied by United Kingdom and the third place is secured by India for publishing more number of publications. It is concluded with a request to the Ministry of Human Research Development of the global countries to allocate more funds to do many more research to control the pollution and lay a firm platform

to build a healthy society.

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