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Research Article

Phyllanthus emblica (Medicinal Plant) Research: A Scientometric Assessment of Global Publications Output during 2008-17

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Abstract

The paper examines 836 publications in *Phyllanthus emblica* Linn as covered in multidisciplinary Scopus international database during 2008-17 on a series of indicators including growth rate, global share, citation impact, international collaborative papers share, and others. The global research in the subject registered negative annual average growth -0.06% and its citation impact averaged to 10.84 citations per paper. India contributed 73.64% the global share, the highest compared to other top 10 most productive countries as their global share ranged from 1.12% to 6.23%. Three top most productive countries registered their relative citation index above the world average of the group (1.37): Bangladesh (2.27), Japan (1.73) and China (1.49) during 2008-17. Pharmacology, toxicology and pharmaceutics is most popular subject in *Phyllanthus emblica* research; it contributed the largest publications share of 36.21%, followed by medicine (31.50%), and others. A total of 236 organizations and 321 authors contributed to *Phyllanthus emblica* Linn research. The top 10 most productive global organizations and authors together contributed 13.32% and 10.50% global publication share and 17.16% and 17.22% global citation share respectively during 2008-17. *Phyllanthus emblica* Linn research comprising 621 journal papers was published across 279 journals. The top 15 most productive journals contributed 25.60% share to the total research papers in journal medium. Fifteen publications received high citations from 72 to 122, cumulated 1331 citations, and averaged to 88.73 citations per paper.

Keywords: *Phyllanthus emblica; Medicinal Plant; Global Publications; Scientometrics; Bibliometrics*

Introduction

Phyllanthus emblica Linn (or *Emblica officinalis* Gaertn.) commonly known as Indian gooseberry or Amla (Sanskrit amalaki) is a deciduous tree of the family Phyllanthaceae. It is known for its edible fruit of the same name [1]. It is considered as one of the most important medicinal plant in Indian traditional systems of medicine (Ayurveda, Unani and Siddha) including folklore Ayurveda, for medicinal and nutritional purposes to build up lost vitality and vigor. *P. emblica* has been extensively used, both as edible (tonic) plants and for its therapeutic potentials. *P. emblica* is highly nutritious and is reported as an important dietary source of vitamin C, minerals and amino acids. All parts of the plant are used for medicinal purposes, especially the fruit.

All parts of *Phyllanthus emblica* are useful in the treatment of various diseases. Among its parts, the most important part is its fruit (known as Amla Fruit). The fruit is widely used in the Indian system of medicine as diuretic, laxative, liver tonic, refrigerant, stomachic, restorative, anti-pyretic, hair tonic, and ulcer preventive and for common cold, fever; as alone or in combination with other plants. The extracts from various parts of *Phyllanthus emblica*, especially fruit, contain numerous phytoconstituents viz tannins, alkaloids, polyphenols, vitamins, minerals amino acids, fixed oils, and flavonoids like rutin and quercetin. Gallic acid, ellagic acid, emblicanin A and B, phyllembein, quercetin and ascorbic acid are found to be biologically effective. Research reports on *Phyllanthus emblica* and its fruit reveals its analgesic, anti-tussive, antiatherogenic, adaptogenic; cardio, gastro, nephron- and neuro-protective, chemo preventive, radio and chemo modulatory and anticancer properties. Various pharmaceutical potential of *Phyllanthus emblica* has been reported previously including possessing potent free radical scavenging, antimicrobial, antioxidant, anti-inflammatory, analgesic and antipyretic, adaptogenic, hepa-

toprotective, antitumor and antiulcerogenic and immunomodulatory activities either in combined formulation or alone. The extract or plant is identified to be efficacious against diversified diseases or ailments like cancer, atherosclerosis, diabetes, liver and heart diseases, inflammation, osteoporosis, neurological disorders, hypertension together with lifestyle diseases, parasitic and other infectious disorders. These actions are attributed to either regulation of various molecular pathway involved in several pathophysiology's or antioxidant property which prevents the damage of cellular compartments from oxidative stress [3-5]. Since *Phyllanthus Emblica* Linn is considered as one of the most important medicinal plant in Indian traditional systems of medicine and no bibliometric study had been undertaken on this plant, as a result we decided to make a bibliometric assessment of research in this area.

Literature Review

No scientometric study is at present available on *Phyllanthus Emblica* Linn, however, few other scientometric studies are available on other individual medicinal plants, such as *Aloe vera* [6], *Curcuma longa* [7], *Glycyrrhiza glabre* [8], *Ocimum sanctum indica* [9], *Phoenix dactylifera* [10] *and Tinospora cordifolia* [11].

Objectives of the Study

The present study aims to analyze the quantitative and qualitative performance of global *Phyllanthus emblica* research during 2008-17, based on publications covered in Scopus database. The specific objectives of the study are:

- To study growth and distribution of global literature on *Phyllanthus emblica;*
- To study the profile of 10 most productive countries, 10 most productive organizations and 10 most productive authors;
- To study the distribution publications output by broad subject areas;
- To identify the identification of significant keywords for studying trends in research;
- To identify the medium of communication and
- To study the characteristics of highly cited publications.

Methodology

The publications data of the world and of top 10 countries on *Phyllanthus emblica* were sourced, using significant keywords "*Phyllanthus emblica*", from the Scopus database (http://www.scopus.com) for the years 2008 to 2017. The "TITLE-ABS-KEY" (as shown in search string below) tag was searched for the keywords restricting the hit to the period 2008-17. The search string was applied first for searching global publication data on *Phyllanthus emblica* and then further restricted to individual country by name in "country tag" one by one to ascertain publication output of top 10 most productive countries (including India). On further refining the search string, using analytical tags in Scopus database, by "subject area tag", "country tag", "source title tag", "journal title name" and "affiliation tag", statistics on distribution of publications output by subject, collaborating countries, author-wise, organization-wise and journal-wise, etc. was obtained. Citation data was obtained from date of publication till 29 May 2018.

TITLE-ABS-KEY(*Phyllanthus emblica* or *Emblica officinalis* or amla) AND PUBYEAR > 2007 AND PUBYEAR < 2018

Data Analysis and Results

The total research output of the world on the topic of *Phyllanthus emblica* cumulated to a total of 638 publications in 10 years during 2008-17. *Phyllanthus emblica* research has been found to be on the decline. The change in the annual research output in the subject started witnessing drop effective from 87 in 2011 to 40 publications in 2017. The 10-year global publications output (638) on *Phyllanthus emblica* -0.06% growth and averaged 10.84 citations per paper. Its 5-year citation impact dropped from 15.51 during 2008-12 to 4.95 citations per paper (CPP) during 2013-17 (Table 1 and Figure 1). Of the total global publications (638), 88.24% (563) appeared as articles, 7.21% (46) as reviews, 3.13% (20) conference papers and others-such as book chapters, editorials, letters, notes and short surveys accounted for 0.16% each during the period.

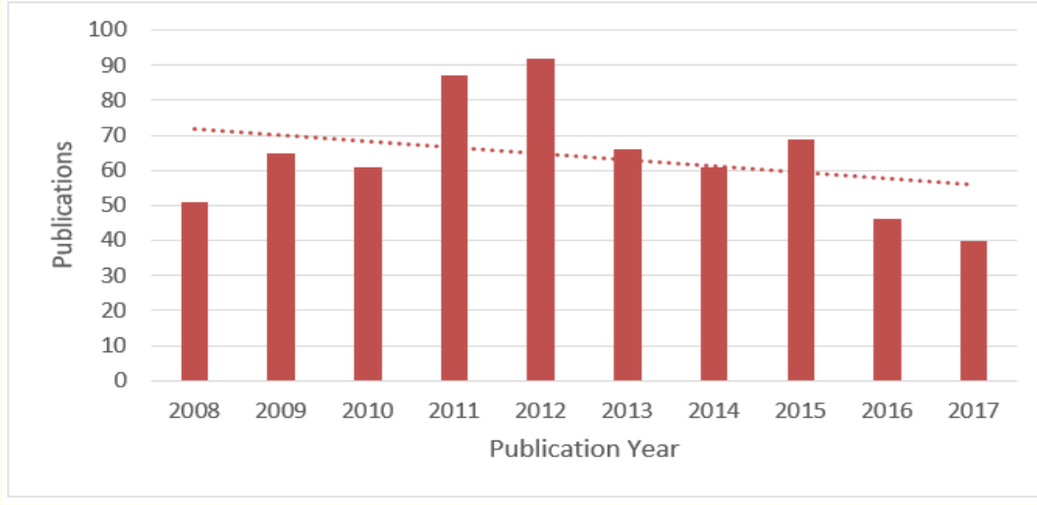

Figure 1: *Medicinal plant research growth trend 2008-17.*

Publication Period	World		
	TP	TC	CPP
2008	51	1188	23.29
2009	65	1268	19.51
2010	61	834	13.67
2011	87	1165	13.39
2012	92	1067	11.60
2013	66	469	7.11
2014	61	431	7.07
2015	69	295	4.28
2016	46	148	3.22
2017	40	52	1.30
2008-12	356	5522	15.51
2013-17	282	1395	4.95
2008-17	638	6917	10.84

Table 1: *Global research output on Phyllanthus emblica during 2008-17.*
TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper.

Most productive countries on *Phyllanthus emblica*

In all, 46 countries contributed a total of 638 papers to global literature on Phyllanthus emblica in 10 years during 2008-17. Of the 46 countries, 34 countries contributed 1 - 5 papers each, 1 country 6 - 10 papers, 10 countries 11 - 50 papers each and 1 country 461 papers. India ranked top as the most productive country in the world. The top 10 most productive countries contributed 7 to 461 papers each; together they contributed 626 papers (98.12% global share) and 6945 citations (more than 100% global share). The 5-year global publications share of top 10 countries decreased from 100.0% during 2008-12 to 95.74% during 2013-17. India accounts for the largest publications share (73.64%), followed distantly by China (6.23%), Thailand (5.11%), USA (4.15%) and other 6 countries (from 1.12%

to 2.72%) during 2008-17. The 5-year global publications share of top 10 countries individually dropped marginally varying between 0.08% and 2.81% during 2008-12 to during 2013-17. Three of top 10 countries scored relative citation index above the world average of the group (1.37): Bangladesh (2.27), Japan (1.73) and China (1.49) during the period. Although India has emerged as the world leader in Phyllanthus emblica research, its performance in terms of relative citation index (0.88) has come much below the world average of the group (1.37) (Table 2 and Figure 2).

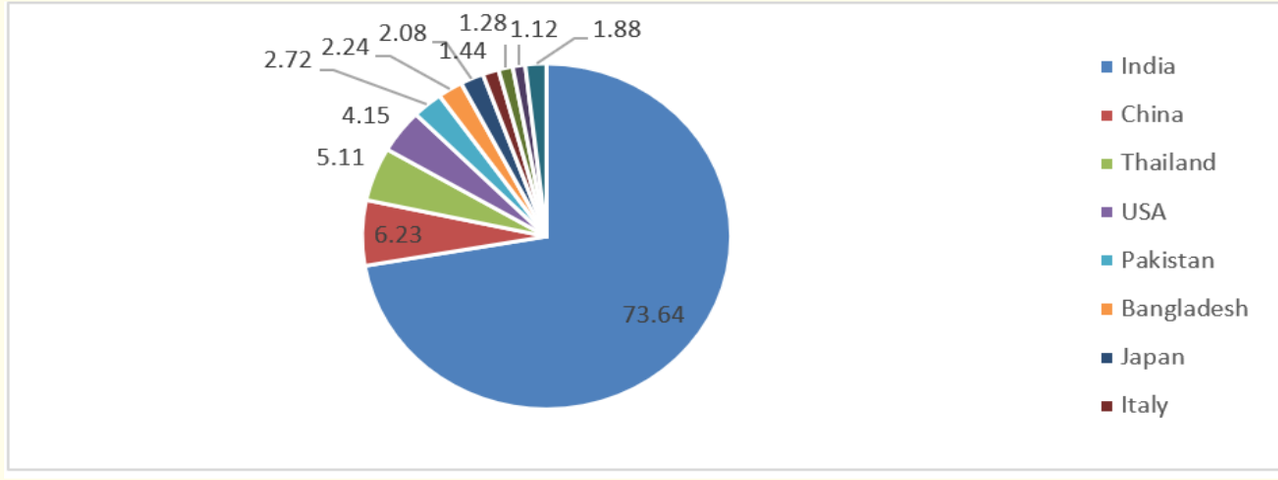

Figure 2: *Medicinal plant research: global publications share %.*

S. No	Name of the Country	Number of Papers			Share of Papers			TC	CPP	HI	ICP	%ICP	RCI
		2008-12	2013-17	2008-17	2008-12	2013-17	2008-17	2008-17					
1	India	283	178	461	63.12	65.93	73.64	4408	9.56	32	41	41.00	0.88
2	China	15	24	39	8.51	8.89	6.23	632	16.21	13	6	6.00	1.49
3	Thailand	16	16	32	5.67	5.93	5.11	432	13.50	11	4	4.00	1.25
4	USA	16	10	26	3.55	3.70	4.15	360	13.85	12	17	17.00	1.28
5	Pakistan	6	11	17	3.90	4.07	2.72	202	11.88	7	7	7.00	1.10
6	Bangladesh	6	8	14	2.84	2.96	2.24	344	24.57	6	4	4.00	2.27
7	Japan	6	7	13	2.48	2.59	2.08	244	18.77	8	9	9.00	1.73
8	Italy	4	5	9	1.77	1.85	1.44	116	12.89	5	2	2.00	1.19
9	Malaysia	0	8	8	2.84	2.96	1.28	115	14.38	2	5	5.00	1.33
10	South Korea	4	3	7	1.06	1.11	1.12	92	13.14	5	5	5.00	1.21
	Total	356	270	626	100.0	95.74	98.12	6945		10.1	100	100	1.37
	World	356	282	638				6917	10.84				
	Share of 10 Countries in World Total	100.0	95.74	98.12									

Table 2: *Global research output and publication share of top 10 Countries in Phyllanthus emblica during 2008-17.*

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper; HI: h-index;

ICP: International Collaborative Papers; RCI: Relative Citation Index.

International Collaboration

The national-level share of top 10 most productive countries to international collaborative output in *Phyllanthus emblica* research varied widely from 2.0% to 41.0%, with India accounting for the highest ICP share (41.0%), followed distantly by USA (17.0%), Japan (9.0%), Pakistan (7.0%), China (6.0%), Malaysia and South Korea (5.0% each), Thailand and Bangladesh (4.0% each) and Italy (2.0%) during 2008-17. That India accounts for the highest ICP share (41%) in the subject is a matter of surprise.

Subject-wise distribution of research output

Global research output on *Phyllanthus emblica* published during 2008-17 was classified under seven broad subjects (as defined by Scopus). Pharmacology, toxicology and pharmaceutics accounted for the largest publications share (36.21%), followed by medicine (31.50%), agricultural and biological sciences (29.78%), biochemistry, genetics and molecular biology (24.76%) and others 3 subjects (from 5.64% to 8.93%) during 2008-17. The five-year activity index (with its global average value being 100) showed increase in 4 areas: pharmacology, toxicology and pharmaceutics (from 93.10 to 108.71), medicine (from 90.05 to 112.56%), biochemistry, genetics and molecular biology (from 93.01 to 108.82), chemistry (from 81.75 to 123.04). On the other hand, the activity index witnessed decline in three areas: agricultural and biological sciences (from 129.22 to 63.11), environment science (from 103.55 to 95.52) and immunology and microbiology (from 134.41 to 56.56) during 2008-12 to 2013-17. Chemistry, among various subjects registered the highest citations impact per paper of 16.07, medicine (13.29), immunology and microbiology (12.89), pharmacology, toxicology and pharmaceutics (11.36), agricultural and biological sciences (11.17), biochemistry, genetics and molecular biology (8.61) and environment science (6.31) during 2008-17 (Table 3 and Figure 3).

S. No	Subject*	Number of Papers (TP)			Activity Index		TC	CPP	%TP
		2008-12	2013-17	2008-17	2008-12	2013-17	2008-17		
1	Pharmacology, Toxicology and Pharmaceutics	120	111	231	93.10	108.71	2625	11.36	36.21
2	Medicine	101	100	201	90.05	112.56	2672	13.29	31.50
3	Agricultural and Biological Sciences	137	53	190`	129.22	63.11	2122	11.17	29.78
4	Biochemistry, Genetics and Molecular Biology	82	76	158	93.01	108.82	1361	8.61	24.76
5	Chemistry	26	31	57	81.75	123.04	916	16.07	8.93
6	Environment Science	26	19	45	103.55	95.52	284	6.31	7.05
7	Immunology and Microbiology	27	9	36	134.41	56.56	464	12.89	5.64
	World Output	356	282	638					

Table 3: *Subject-wise breakup of global publications in Phyllanthus emblica during 2008-17.*

There is overlapping of literature covered under various subjects

TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper.

Profile of top 20 most productive global organizations

Two hundred Thirty Six (236) organizations participated in global research on *Phyllanthus emblica* during 2008-17, of which 209 organizations contributed 1 - 5 papers each, 26 organizations 6 - 10 papers each and 1 organization 12 papers. The top 10 most productive global organizations contributed 85 papers (13.32% share) and 1187 citations (17.16% share). Individually top 10 organizations contributed 7 - 12 papers in 10 years during 2008-17:

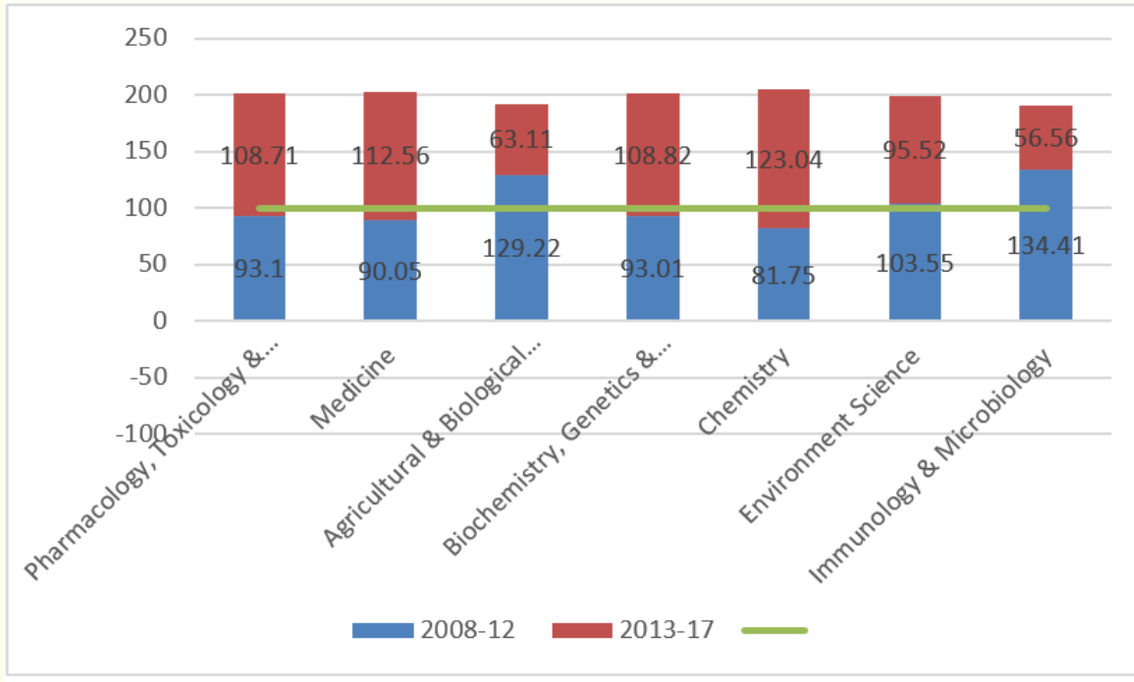

Figure 3: *Five-year change in activity index by subject areas influencing medicinal plants research.*

- **Only three organizations:** Registered productivity rate above the group average of 8.5 per organization: University of Madras, Chennai, India (12 papers), Annamalai University, India and Father Muller Medical College Hospital, Mangalore, India (10 papers each);
- **Five organizations:** Registered citation impact and relative citation index above the group average of 10.84 citations per publi cation and 1.29: Chiang Mai University, Thailand (31.43 and 2.90), Annamalai University, India (22.90 and 2.11), Thammasat University, Thailand (21.71 and 2.0), Father Muller Medical College Hospital, Mangalore, India (17.70 and 1.63) and Kuruk shetra University, India (14.38 and 1.33);
- **Five organizations:** Registered international collaborative publications (ICP) above the group average of 8.24%: Annamalai University, India (20.0%), University of Madras, Chennai, India (16.67%), Chiang Mai University, Thailand (14.29%), Vellore Institute of Technology, India (14.29%) and Indian Agricultural Research Institute, New Delhi, India (12.50%) (Table 4).

Profile of top 15 most productive authors

Three Hundred Twenty One (321) authors participated in global Phyllanthus emblica research during 2008-17, of which 311 authors contributed 1 - 5 papers each and 10 authors 6 - 9 papers each. The top 10 most productive authors individually contributed from 6 to 9 publications and together 638 papers (10.50%) and 1191 citations (17.22% share).

- **Four authors:** Registered rate above the group average of 6.7 per author: M.S. Baliga (9 papers), S. Mirunalini (8 papers), P. Sa chdanandam and S. Singh (7 papers each);
- **Seven authors:** Registered citation impact and relative citation index above the group average of 10.84 citations per publica tion and 1.64: M. Zhao (52.0 and 4.80), M. Krishnaveni (22.50 and 2.08), S. Mirunalini (20.75 and 1.91), M.S. Baliga (19.56 and 1.80), C.R. Yang (17.50 and 1.61), Y.J. Zhang (17.50 and 1.61) and W.F. Wang (16.50 and 1.52);
- **Three authors:** Registered international collaborative publications share above the group average of 8.96%: W.F. Wang, C.R. Yang and Y.J. Zhang (33.33% each) (Table 5).

S. No	Name of the Organization	TP	TC	CPP	HI	ICP	%ICP	RCI
1	University of Madras, Chennai, India	12	115	9.58	7	2	16.67	0.88
2	Annamalai University, India	10	229	22.90	8	2	20.00	2.11
3	Father Muller Medical College Hospital, Mangalore, India	10	177	17.70	5	0	0.00	1.63
4	Indian Agricultural Research Institute, New Delhi, India	8	35	4.38	3	1	12.50	0.40
5	Birbal Sahni Institute of Palaeobotany, Lucknow, India	8	39	4.88	3	0	0.00	0.45
6	Kurukshetra University, India	8	115	14.38	5	0	0.00	1.33
7	Dr ALM Postgraduate Institute of Medical Sciences, Chennai, India	8	72	9.00	5	0	0.00	0.83
8	Chiang Mai University, Thailand	7	220	31.43	5	1	14.29	2.90
9	Vellore Institute of Technology, India	7	33	4.71	4	1	14.29	0.43
10	Thammasat University, Thailand	7	152	21.71	4	0	0.00	2.00
	Total of 10 organizations	85	1187	13.96	4.9	7	8.24	1.29
	Total of World	638	6917	10.84				
	Share of top 10 organizations in World total output	13.32	17.16					

Table 4: *Scientometric profile of Top 10 most productive global organizations on Phyllanthus emblica during 2008-17. TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper; HI: h-index; ICP: International Collaborative Papers; RCI: Relative Citation Index.*

S. No	Name of the Author	Affiliation of the Author	TP	TC	CPP	HI	ICP	%ICP	RCI
1	M.S. Baliga	Father Muller Medical College Hospital, Mangalore, India	9	176	19.56	5	0	0.00	1.80
2	S. Mirunalini	Annamalai University, India	8	166	20.75	5	0	0.00	1.91
3	P. Sachdanandam	Dr ALM Postgraduate Institute of Medical Sciences, Chennai, India	7	69	9.86	5	0	0.00	0.91
4	S. Singh	Central Institute of Arid Horticulture, Bikaner, India	7	14	2.00	3	0	0.00	0.18
5	M. Krishnaveni	Annamalai University, India	6	135	22.50	5	0	0.00	2.08
6	A.K. Singh	Central Horticultural Experimental Station, Vajalpur (Godhra), Gujarat, India	6	10	1.67	2	0	0.00	0.15
7	W.F. Wang	Guangzhou Jinnan Biomedicine R and D Centre, Guangzhou, China	6	99	16.50	4	2	33.33	1.52
8	C.R. Yang	Kunming Institute of Botany, Kunming, China	6	105	17.50	5	2	33.33	1.61
9	Y.J. Zhang	Kunming Institute of Botany, Kunming, China	6	105	17.50	5	2	33.33	1.61
10	M. Zhao	South China University of Technology, Guangzhou, China	6	312	52.00	6	0	0.00	4.80
		Total of 10 authors	67	1191	17.78	4.5	6	8.96	1.64
		Total of world	638	6917	10.84				
		Share of top 10 authors in world total output	10.50	17.22					

Table 5: *Scientometric profile of top 15 most productive authors on Phyllanthus emblica during 2008-17. TP: Total Papers; TC: Total Citations; CPP: Citations Per Paper; HI: h-index; ICP: International Collaborative Papers; RCI: Relative Citation Index.*

Channel of research communication

Of the total world output on *Phyllanthus emblica* research, 97.34% (621) appeared in journals, 1.57% (10) in book series, 0.78% (5) as books and 0.31% (2) as trade publications during 2008-17. 621 journal papers appeared in 279 journals, of which 62 journals published 1 - 5 papers each, 13 journals 6 - 10 papers each and 4 journals 11 - 20 papers each during 2008-17.

The top 15 most productive journals reported 6 to 20 papers each and together they contributed 159 papers, constituting 25.60% of total output in journal medium. The five-year journal output share of top 15 journals decreased from 26.30% to 24.73% during between 2008-12 and 2013-17. *Journal of Ethnopharmacology* contributed the largest number of papers (20), followed by *International Journal of Pharma and Bio Sciences* (16 papers), *International Journal of Pharmacy and Pharmaceutical Sciences* (13 papers), etc. during 2008-17 (Table 6 and Figure 4).

S. No	Name of the Journal	Number of Papers		
		2008-12	2013-17	2008-17
1	*Journal of Ethnopharmacology*	11	9	20
2	*International Journal of Pharma and Bio Sciences*	7	9	16
3	*International Journal of Pharmacy and Pharmaceutical Sciences*	4	9	13
4	*Food Chemistry*	7	5	12
5	*International Journal of Pharmaceutical Science Review and Research*	3	8	11
6	*Phytotherapy Research*	8	3	11
7	*Indian Journal of Agricultural Sciences*	9	1	10
8	*Journal of Food Science and Technology*	9	1	10
9	*Pharmaceutical Biology*	6	4	10
10	*Journal of Medicinal Plants Research*	9	0	9
11	*BMC Complementary and Alternate Medicine*	2	6	8
12	*Journal of Medicinal Foods*	6	2	8
13	*Research Journal of Pharmaceutical Biology and Chemical Sciences*	3	5	8
14	*Evidence-Based Complementary and Alternate Medicine*	4	3	7
15	*Asian Journal of Pharmaceutical and Clinical Research*	3	3	6
	Total of 15 journals	91	68	159
	Total global journal output	346	275	621
	Share of top 15 journals in global journal output	26.30	24.73	25.60

Table 6: *Top 15 most productive journals which reported global output on Phyllanthus emblica during 2008-17.*

Significant Keywords

Around 51 significant keywords have been identified from the literature which through light on the research trends in *Phyllanthus emblica* research including its pharmacological properties and medicinal uses. These keywords are listed in table 7 in the decreasing order of the frequency of their occurrence in the literature during 2008-17.

Significant Keywords

A total of 15 highly cited papers were identified in global literature on *Phyllanthus emblica* research, receiving 72 to 122 citations per paper. Of these, 6 papers received citations in the citation range 72 - 80, 5 papers were in citation range 91 - 100, and 4 papers were in 101 - 122 citations range since their publication in 10 years during 2008-17. Together these 15 papers cumulated a total of 1331 citations, averaging 88.73 citations per paper. Of the 15 highly cited papers, 8 resulted from research organizations in their stand-alone capacity role (non-collaborating) and remaining 7 from two or more research organizations in their roles as collaborating partners per paper (6

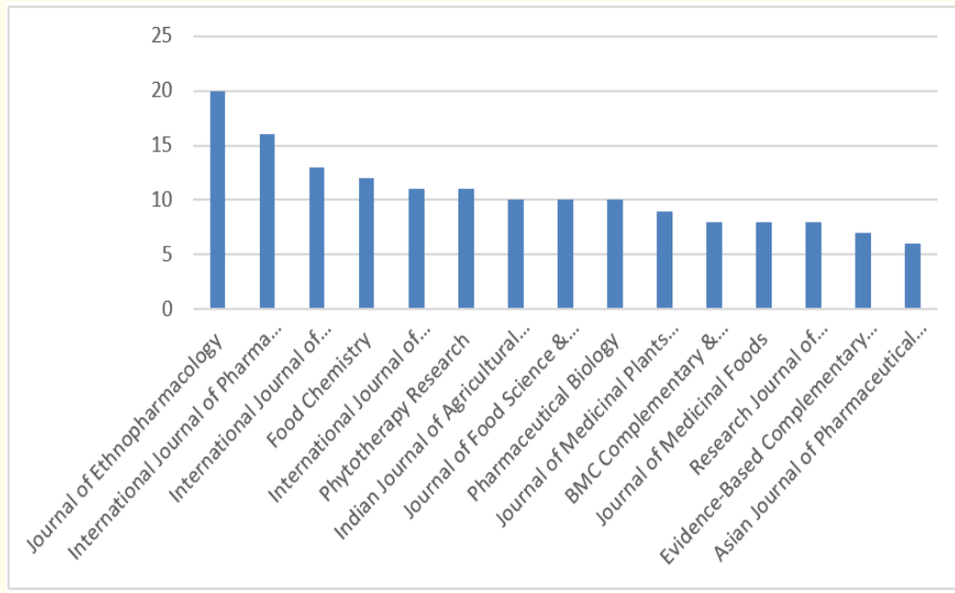

Figure 4: *Top 15 journals in medicinal plants research 2008-17.*

S. No	Keyword	Frequency	S. No	Keyword	Frequency
1	*Phyllanthus emblica*	480	27	Anti-bacterial Activity	38
2	*Emblica Officinalis*	497	28	Apoptosis	38
3	Plant Extract	169	29	High Performance Liquid Chromatography	37
4	Fruit	155	30	Amla	35
5	Medicinal Plant	146	31	Anti-inflammatory Activity	33
6	Anti- Oxidant Activity	115	32	Tanin Derivative	33
7	Antioxidants	114	33	Bark	32
8	Drug Effect	80	34	Plant Toot	31
9	Herbaceous Agent	66	35	Diabetes Mellitus	30
10	Phytotherapy	65	36	Anti-microbial Activity	29
11	Plant Leaf	65	37	*Staphylococcus aureus*	29
12	Ascorbic Acid	61	38	Drug Formulation	28
13	Gallic Acid	59	39	Anti-neoplastic Activity	27
14	Drug Efficacy	57	40	Liver Protection	27
15	Oxidative Stress	57	41	Plant Medicinal products	27
16	Flavanoid	53	42	Plant Seed	27
17	Phytochemistry	48	43	Herbal Medicine	26
18	Ayurveda	47	44	Liver	26
19	Drug Mechanism	46	45	*Escherichia coli*	25
20	Drug Screening	46	46	Cytotoxicity	23
21	Drug Effects	45	47	Histopathology	23
22	Drug Isolation	45	48	Antidiabetic Activity	22
23	Lipid Peroxidation	43	49	Phenol	22
24	Enzyme Activity	42	50	Plant Stem	21
25	Traditional Medicine	42	51	Pathology	20
26	*Phyllanthus*	39			

Table 7: *List of Significant Keywords in Literature on Global Phyllanthus emblica during 2008-17.*

national collaborative and 1 international collaborative). Among 15 highly cited papers, the largest participation was seen from India (10 papers), followed by Bangladesh and Brazil (2 papers) and China, Malaysia, Singapore and Thailand (1 paper each) during 2008-17. These 15 highly cited papers involved the participation of 75 personal authors and 25 research organizations in total across globe. Of the 15 highly cited papers, 14 were published as articles and 1 as review paper. These 15 highly cited papers were published in 13 journals, with 3 papers in *Journal of Ethnopharmacology*, 1 paper each in *African Journal of Traditional, Complementary and Alternative Medicines, American-Eurasian Journal of Sustainable Agriculture, BMC Complementary and Alternative Medicine, Food and Chemical Toxicology, Food Chemistry, European Journal of Cancer Prevention, Journal of Basic and Clinical Physiology and Pharmacology, Journal of Medicinal Plants Research, Journal of Natural Medicines, Journal of Surgical Research, Medicinal Chemistry and Pakistan Journal of Biological Sciences.*

Discussion and Conclusion

This paper provides a quantitative and qualitative description of *Phyllanthus emblica* research conducted across the world during the last 10 years (2008-17). The data for the study comprising 638 records was derived from the Scopus database. *Phyllanthus emblica* research registered -0.06% (negative) annual average growth and averaged citation impact of 10.84 citations per paper during the period. That annual output started declining from 86 in 2011 to 40 publications in 2017 implies that *Phyllanthus emblica* research is on a declining curve.

India tops in the list of 10 most productive countries in the world. India accounted for 73.64% global publications share, whereas other 9 top ranking countries global share ranged between 1.12% and 6.23% during the period. The 5-year global publication share of all top 10 countries increased from 0.08% to 2.81% during 2008-12 to 2013-17. Of the top 10 countries, three registered their relative citation index above the world average of the group (1.37): Bangladesh (2.27), Japan (1.73) and China (1.49) during 2008-17.

Pharmacology, toxicology and pharmaceutics are the most sought after subject area of interest to *Phyllanthus emblica* research. It accounts for the highest publications share, followed by medicine (31.50%), agricultural and biological sciences (29.78%), biochemistry, genetics and molecular biology (24.76%) and other others 3 subjects (from 5.64% to 8.93%) during 2008-17.

A total of 236 organizations and 321 authors contributed to *Phyllanthus emblica* research. Of these, the top 10 most productive global organizations and authors together contributed 13.32% and 10.50% global publication share and 17.16% and 17.22% global citation share respectively during 2008-17. The leading organizations in terms of publication productivity were: University of Madras, Chennai, India (12 papers), Annamalai University, India and Father Muller Medical College Hospital, Mangalore, India (10 papers each). The leading organizations in terms of citation impact per paper and relative citation index were: Chiang Mai University, Thailand (31.43 and 2.90), Annamalai University, India (22.90 and 2.11), Thammasat University, Thailand (21.71 and 2.0), Father Muller Medical College Hospital, Mangalore, India (17.70 and 1.63) and Kurukshetra University, India (14.38 and 1.33).

The journal medium accounted for 97.34% global share of 638 papers on *Phyllanthus emblica* published across 279 journals. The top 15 most productive journals accounts for 25.60% of total publications output in journal medium during 2008-17. *Journal of Ethnopharmacology* contributed the largest number of papers (20), followed by *International Journal of Pharma and Bio Sciences* (16 papers), *International Journal of Pharmacy and Pharmaceutical Sciences* (13 papers), etc. during 2008-17.

Of the total 638 publications on *Phyllanthus emblica* during the period, 15 registered comparatively higher citations (in the range of 72 - 122 per paper). These 15 highly cited papers received a total of 1331 citations, averaging to 88.73 citations per paper. India contributed the highest number of highly cited papers (10), whereas other countries contributed 1 to 2 papers each. The 15 highly cited papers (consisting of 14 as articles and 1 review) involved the participation of 75 authors and 25 organizations and were published in 13 journals, of which 3 papers were in *Journal of Ethnopharmacology* and 1 paper each in 12 other journals.

Conclude that *Phyllanthus emblica* prevents innumerable health diseases and disorders as it contains essential nutrients with highest quantity of Vitamin B, besides having strong antioxidant and biological properties. It is also used as a possible food additive or in nutraceutical and biopharmaceutical industries. *Phyllanthus emblica* extracts and herbal formulations depicted potential for therapeutic benefits on a similar line shown by standard drugs against various diseases. In spite of possessing such impressive and useful features,

Phyllanthus emblica research is on a declining curve. There is an urgent need to undertake intensive research in the area in order to explore, discover more and additional explored medicinal properties and values of medicinal plants at molecular level for the ultimate benefit of the mankind.

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