ISSN (Print): 0972-2467
ISSN (Online): 0976-2477
SRELS Journal of Information Management, Vol 54(4), August 2017, p. 175-182 DOI: 10.17821/srels/2017/v54i4/113833

Comparison of Selected Journal Quality Indicators of Analytical Chemistry Journals

Akil Ahmad[1], Shakil Ahmad[2*], Abu Waris[2] and Isam Mohammed Abdel-Magid[3]

[1]University of KwaZulu Natal, Durban, 4041, Past: Postdoc-UTM, UK.
[2]Imam Abdulrahman Bin Faisal University Library, KSA; shakilahma@gmail.com, abu.waris@gmail.com
[3]Environmental Engineering Department, College of Engineering, Imam Abdulrahman Bin Faisal University, Kingdom of Saudi Arabia; isam.abdelmagid@gmail.com

Abstract

Aim of this research study is to predict the correlation, if any, between the journal impact factor, SCImago ranking, Eigenfactor score and H-index of Analytical chemistry journals and quality of these journals. JIF is considered a good parameter for evaluation of scientific journals but has been criticized on many counts such as self-citation, limitation to English language etc. Seventy five (75) analytical chemistry journals indexed in WoS and Scopus databases were selected in this research for comparison of various indices. Correlations between indices (JIF, ES, SJR, and H-index) were evaluated using Pearson and Spearson's correlation. Annual Review of Analytical Chemistry was at the top with JIF of 8.0 and the lowest for American Laboratory journal with JIF of 0.028. In case of SCImago ranking, Eigenfactor score and H-index, highest valued journals were reported as Annual Review of Analytical Chemistry (SJR = 3.078), Analytical Chemistry (ES = 0.1588) and Analytical Chemistry (H-index = 109). Lowest valued journals were reported as American Laboratory journal (SJR = 0.106), Archeosciences-Revue D Archeometrie (ES = 0.0001) and Instrumentation Science and Technology (H-index = 0). Throughout the study, none of the journals had the same ranking to compare different indicators. Pearson's correlation between JIF and SJR values reached a high value (0.936) as compared to either ES (0.558) or H5 (0.567).

Keywords: Analytical Chemistry, Eigenfactor Score (ES), H-Index, Journal Impact Factor (JIF); SCImago Ranking (SJR)

1. Introduction

'Journal Impact Factor' (JIF) is an important parameter of a journal's standing[1]. It is computed based on number of citations to articles published[2]. Many have criticized IF on such counts as self-citations, lack of quality assessment, and English language bias, etc. despite its wide acceptance[3-5]. JIF was originally developed by Eugene Garfield. JIF is defined as the total number of citations in a year (for example, 2016) to the published articles during two preceding years (say 2014 and 2015), divided by the number of such documents[6].

Most other common utilized markers for the evaluation of research and scientific journals are: Eigenfactor Score (ES), SCImago Journal Rank indicator (SJR) and H5-index indicator (Figure 1).

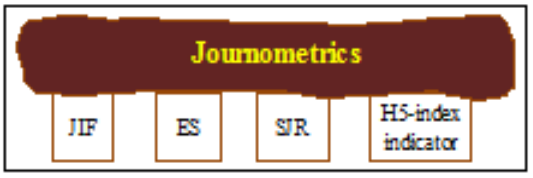

Figure 1. Journal quality indices.

SCImago Journal Rank (SJR) is another index which is used for quality estimation based on references from Scopus indexed journals, applying the Page Rank algorithm on the Scopus database (Elsevier). This indicator is more complex as compared to JIF[7]7.

Eigenfactor Score (ES) was designed as a new bibliographic indicator which is calculated on the basis of Google's Page Rank utilizing the Web of Science (WoS)

*Author for correspondence

indexed journals for quality assessment. It reflects both the quality and quantity; i.e. reputation of citation source and number of citations[8].

H-index is a very important parameter of the scientific reputation of researchers which is mainly provided by Scopus, (WoS), and Google Scholar Citations[9]. It mainly describes the scientific productivity and impact of the researcher. It is defined as the number of papers by an author that have received at least that many citations (if 10 papers of an author have received at least 10 citations each, then the author's h-index is[10]10).

2. Materials, Methods and Sources of Information

In this study Analytical Chemistry journals were chosen and recognized in the journal sources of SCImago indexing journal and country ranking site. From Analytical Chemistry Core Collection official site from Web of Science and references from ISI listed journals were utilized for the calculation of potential impact factor. Latest JIFs and ESs of the year 2015 were collected from Journal Citation Report® (JCR) through WoS. All the relevant data's of 2015 including impact of self-references, citable archives, references to unique and audit articles were collected from their source databases. The SJR indexing journal of 2015, furnished by the SCImago Journal and country rank, as created by the SCImago research group were reclaimed from its official website. The listed journals with JIFs and ESs and ranking information of the SJR indexing journal list were reclaimed on the basis of their global standard serial number (ISSN). Additionally, journals with the SJR indexing were catalogued and their ranking was found in the list of journal JIFs.

To identify the Analytical Chemistry journal under all journals category, mainly three unique sources were searched such as Science Citation Index Expanded provided by WoS, SCImago Journal Ranking maintained by SCOPUS and GS measurements under the class of "Analytical Chemistry". The following information was obtained for each identified journal:

- 2015 JIF from Journal Citation Report of WoS, and
- 2015 SJR from SCOPUS.

The correlations between the obtained data were calculated using Pearson's correlation coefficient. The ranks of each journal according to each metrics were also examined and compared statistically using the Wilcoxon signed ranks test. P-values less than 0.05 were considered statistically significant. All analyses were carried out using Statistical Package for the Social Sciences (SPSS) 21.0, version 2012.

3. Research Objective

In this work, the quality measurements of particular journals of Analytical Chemistry were discussed and compared with various parameters. The objective of this research study is to distinguish database scope of Analytical Chemistry journals in Scopus and Web of Science and to analyze the measurements components of the journals as related to international quality ranking indices of JIF, ES, SJR and H5 index.

4. Results and Discussions

Overall seventy five (75) Analytical Chemistry journals were selected for this study. It is to be noted that these journals covered a wide range of divisions and sub specializations in analytical chemistry spanning over: annual review, trends, biosensorsm bioelectronics, separation and purification, sensors and actuators, chromatography, pyrolysis, atomic and mass spectrometry, pharmaceutical and radiopharmaceuticals, micro chemical, phytochemical, electrophoresis, environmental and nuclear chemistry, fluorescence toxicology, biomolecular screening, peptide science, calorimetry, cultural heritage, archaeometry and laboratory automation. Likewise, they included analytical letters, accreditation and quality assurance, soil science and plant analysis, conservation.

The entire listed Analytical Chemistry journals in present work are ISI and Scopus indexed journals. The comparative study was carried out in terms of Journal Impact Factor (JIF), Eigenfactor Score (ES), SCImago Journal Ranking (SJR) and H-index, which are shown in Table 1. All values for selected Analytical Chemistry Journal in terms of JIF, ES, SJR and H-index are listed in Table 1. All the journals having the different scope and aim of the Analytical Chemistry fields are summarized and discussed in this study.

Table 1 depicts the results. All the selected journals are highly reputed and of standard quality in terms of impact factor and rest of indices which is listed in WoS, Scopus and other databases. Table 1 clearly shows that none of the chosen Analytical Chemistry journals had the same ranking to compare with all chosen indicators.

In selected Analytical journal, all are not only the ISI indexed but some are Scopus indexed also. From the results, it confirms that both the WoS and Scopus journal have high visibility among all the reader/researcher of

Analytical Chemistry journals. Easy accessibility of all the research findings, significance of citation, research work advantages and elaborative research fields are very important among the researchers, scientists and academicians. The three most reputed and highly cited Analytical Chemistry JIF value of 8.0, 7.47 and 7.47 for Annual Review of Analytical Chemistry, TRAC-Trends in Analytical Chemistry and Biosensors & Bioelectronics, respectively. Some of moderate JIF value journals are also listed such as Journal of Analytical Atomic Spectrometry, Analytical and Bioanalytical Chemistry and Journal of the American Society for Mass Spectrometry with JIF value of 3.379, 3.125 and 3.031, respectively. Lowest cited and reputed journals such as Bunseki Kagaku, Archeosciences-Revue D Archeometrie, and American Laboratory with JIF value of 0.229, 0.111 and 0.028 are also included in Table 1.

As per Eigenfactor Score, the top three (3) journal lists are Analytical Chemistry, Journal of Chromatography A and Sensors and Actuators B-Chemical with ES value of 0.1588, 0.06707 and 0.06483, respectively. Bottom of ES journals are Archeosciences-Revue D Archeometrie, American Laboratory and Advances in Chromatography with ES value of 0.0001, 0.0001 and 0.00015, respectively.

The best three SJR indicator rank journals are Annual Review of Analytical Chemistry, TRAC-Trends in Analytical Chemistry and Analytical Chemistry with SJR value of 3.078, 2.517 and 2.369 respectively. American Laboratory journal placed last with SJR value of 0.106. H-index is an important and reputation value for the entire researcher in the scientific world as well for reputation of the journals. Top most cited three (3) analytical chemistry journals are Analytical Chemistry, Journal of Chromatography A and Analytica Chimica Acta

Table 2. Comparative rankings of analytical Chemistry journals by 2015 JIF, ES, SJR and H5 index

Full Journal Title	Journal Impact Factor		Eigenfactor score		SCImago Journal Rank		H5-Index	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Annual Review of Analytical Chemistry	8	1	0.00467	35	3.078	1	30	31
TRAC-Trends in Analytical Chemistry	7.487	2	0.01821	14	2.517	2	63	8
Biosensors & Bioelectronics	7.476	3	0.06121	4	2.15	4	6	67
Analytical Chemistry	5.886	4	0.1588	1	2.369	3	109	1
Separation and Purification Reviews	5.824	5	0.00065	63	1.023	19	0	71
MicrochimicaActa	4.831	6	0.0092	25	1.116	14	38	20
Sensors and Actuators B-Chemical	4.758	7	0.06483	3	1.305	9	72	3
AnalyticaChimicaActa	4.712	8	0.05096	6	1.548	6	72	3
Talanta	4.035	9	0.04583	8	1.233	12	57	9
Analyst	4.033	10	0.0477	7	1.3	10	64	7
Journal of Chromatography Analysis	3.926	11	0.06707	2	1.774	5	73	2
Journal of Analytical and Applied Pyrolysis	3.652	12	0.01166	23	1.53	7	47	12
Journal of Analytical Atomic Spectrometry	3.379	13	0.01244	22	1.022	20	39	17
Journal of Pharmaceutical and Biomedical Analysis	3.169	14	0.0221	11	1.049	16	50	10
Analytical and Bioanalytical Chemistry	3.125	15	0.05463	5	1.096	15	66	6
Journal of the American Society for Mass Spectrometry	3.031	16	0.01512	19	1.322	8	39	17
Microchemical Journal	2.893	17	0.00892	26	0.93	24	38	20
Drug Testing and Analysis	2.859	18	0.00507	33	0.804	31	34	26
Journal of Electroanalytical Chemistry	2.822	19	0.01528	18	0.752	32	41	16
Bioanalysis	2.813	20	0.00728	29	0.671	38	37	22
Journal of Separation Science	2.741	21	0.01677	16	1.041	17	37	22
Journal of Chromatography B-Analytical Technologies in the Biomedical and Life Sciences	2.687	22	0.02395	10	0.947	23	45	13
Critical Reviews in Analytical Chemistry	2.667	23	0.001	58	0.925	25	17	51
Journal of Mass Spectrometry	2.541	24	0.00865	27	0.919	26	31	29
Phytochemical Analysis	2.497	25	0.00332	45	0.855	28	27	33
Electrophoresis	2.482	26	0.01609	17	0.896	27	48	11
Electro Analysis	2.471	27	0.01121	24	0.707	36	35	25

Environmental Chemistry	2.455	28	0.00397	41	0.972	22	24	40
Methods and Applications in Fluorescence	2.429	29	0.00045	68	1.247	11	0	71
Environmental Science-Processes & Impacts	2.401	30	0.00505	34	0.981	21	25	37
Journal of Analytical Toxicology	2.322	31	0.00387	43	1.038	18	30	31
Analytical Biochemistry	2.243	32	0.02143	12	0.725	34	43	14
Rapid Communications in Mass Spectrometry	2.226	33	0.01787	15	0.819	29	39	17
Journal of Biomolecular Screening	2.218	34	0.00637	31	1.122	13	31	29
Chemo Metrics and Intelligent Laboratory Systems	2.217	35	0.00708	30	0.697	37	34	26
Sensors	2.033	36	0.03723	9	0.546	46	69	5
Chirality	2.025	37	0.00424	40	0.662	39	21	46
Journal of Peptide Science	1.951	38	0.00349	44	0.735	33	25	37
Thermochimica-Acta	1.938	39	0.01507	20	0.708	35	42	15
Analytical Methods	1.915	40	0.01946	13	0.623	41	36	24
Journal of Chemo Metrics	1.873	41	0.00289	47	0.574	44	22	44
Journal of Thermal Analysis and Calorimetry	1.781	42	0.01338	21	0.612	43	34	26
Biomedical Chromatography	1.729	43	0.00559	32	0.572	45	26	34
Vibrational Spectroscopy	1.682	44	0.00446	38	0.615	42	26	34
Journal of Fluorescence	1.601	45	0.00459	36	0.465	49	25	37
Journal of Cultural Heritage	1.533	46	0.00286	48	0.658	40	24	40
Journal of Labelled Compounds & Radiophar-ma-ceuticals	1.532	47	0.00234	53	0.468	48	17	51
International Journal of Environmental Analytical Chemistry	1.411	48	0.00206	54	0.425	56	17	51
Reviews in Analytical Chemistry	1.378	49	0.0004	71	0.439	53	17	51
Journal of Analytical Methods in Chemistry	1.369	50	0.00083	61	0.296	62	12	61
Archaeometry	1.364	51	0.00241	51	0.809	30	18	50
Chromatographia	1.332	52	0.0043	39	0.48	47	22	44
Journal of Chromatographic Science	1.32	53	0.0028	50	0.448	52	19	47
Journal of Laboratory Automation	1.297	54	0.0016	57	0.422	57	19	47
Current Analytical Chemistry	1.238	55	0.00093	59	0.429	54	13	59
Analytical Sciences	1.174	56	0.00394	42	0.427	55	23	42
Analytical Letters	1.088	57	0.00324	46	0.368	59	19	47
Accreditation and Quality Assurance	1.01	58	0.00089	60	0.378	58	14	58
Journal of Radioanalytical and Nuclear Chemistry	0.983	59	0.00861	28	0.458	50	26	34
Journal of AOAC International	0.918	60	0.00451	37	0.458	50	23	42
Advances in Chromatography	0.833	61	0.00015	73	0.198	71	0	71
International Journal of Analytical Chemistry	0.719	62	0.00044	69	0.157	73	10	63
Journal of Analytical Chemistry	0.694	63	0.00192	56	0.268	65	13	59
Journal of Liquid Chromatography & Related Technologies	0.669	64	0.00236	52	0.299	61	15	57
JPC-Journal of Planar Chromato-graphy-Modern TLC	0.611	65	0.00072	62	0.284	64	11	62
Chinese Journal of Analytical Chemistry	0.566	66	0.00199	55	0.296	62	16	55
ActaChroma-tographica	0.55	67	0.00047	66	0.227	69	9	64
Communications in Soil Science and Plant Analysis	0.529	68	0.00284	49	0.346	60	16	55
Instrumentation Science & Technology	0.525	69	0.00042	70	0.242	68	0	71
LC GC Europe	0.481	70	0.00046	67	0.223	70	9	64
Studies in Conservation	0.323	71	0.00049	65	0.258	66	9	64
Journal of Water Chemistry and Technology	0.258	72	0.00019	72	0.246	67	6	67
Bunseki Kagaku	0.229	73	0.00058	64	0.159	72	6	67
Archeosciences-Revue D Archeometrie	0.111	74	0.0001	74	0.13	74	5	70
American Laboratory	0.028	75	0.0001	74	0.106	75	6	67

with H-index value of 109, 73 and 72, respectively. From the bottom, three (3) least cited journals are Advances in Chromatography, Instrumentation Science & Technology and Methods and Applications in Fluorescence with H-index value of zero.

Figure 1-3 show bump charts of top ten (10) JIF ranked Analytical chemistry journal with comparison of ES, SJR and H-index ranking.

Figure 1 Clearly shows a sharp decline in ES quality indicator as related to JIF rank for Micro Chim Acta and Ttrac-Trend Anal Chem journals. While Anal Chem and Sep Purif Rev attained their quality level for both indicators.

Figure 2 Indicated that Sep Purif Rev did not have the same quality level of stability when JIF rank is related to SJR indicator. A similar tale could be told for the same journal looking at H5 index of Figure 3. Micro Acta continued its deterioration with this index.

Table 2 demonstrates the bivariate correlation between the four markers (JIF, ES, SJR and H-index) for ranking of Analytical Chemistry Journals. As reported in Table 2 there was a high statistical correlation found between JIF and SJR indicators for journal in this classification (coefficient value = 0.936) according to Pearson's relationship. In the same way, a high correlation was found amongst JIF and SJR markers for Analytical Chemistry Journals (coefficient value = 0.946), according to Spearsman's rho relationship. Least value was found in Pearson's r relationship between JIF and ES markers (r = 0.558) and between JIF and H5 values (r = 0.728) according to Spearsman's rho relationship.

Table 2 offers a bivariate correlation between the three chosen indicators (JIF, ES and H5} for ranking of Analytical Chemistry journals. Table 2 revealed that the Pearson's statistic correlation between JIF and SJR values reached a high value (0.936) as compared its relation to either ES (0.558) or H5 (0.567). The same results is observed for the relationship of Spearman's rho between JIF and SJR rankings (0.946) to yet droop to its correlation with either ES (0.763) or H5 (0.728).

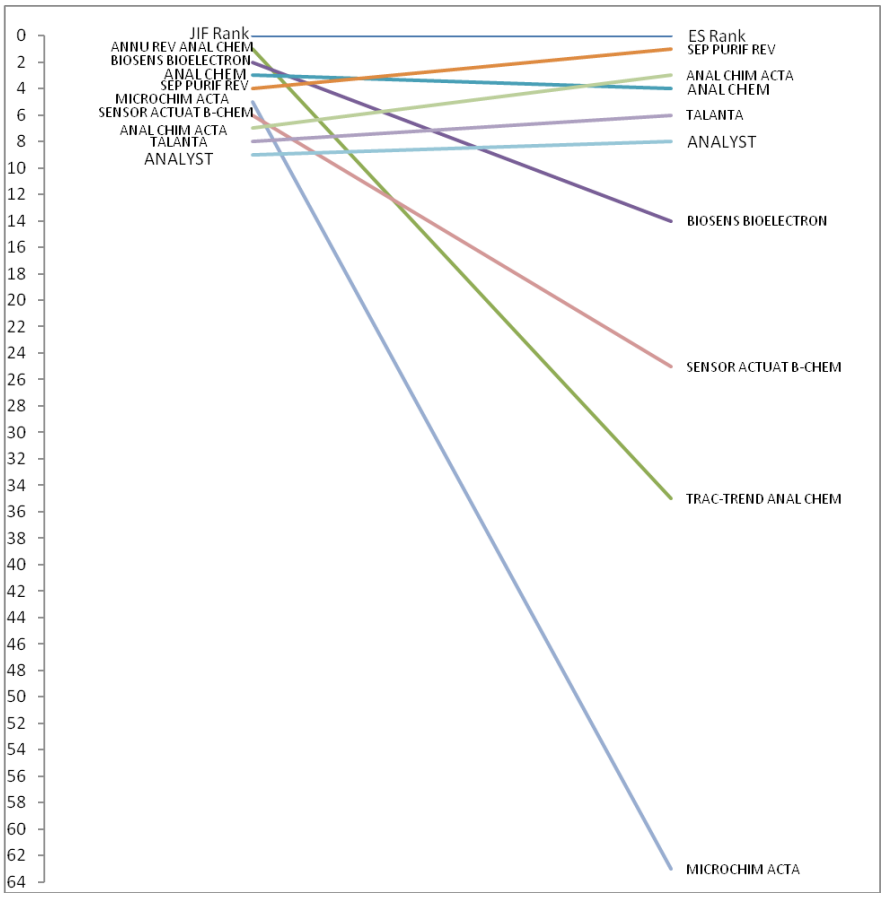

Figure 1. Bump chart for top ten (10) JIF ranked analytical Chemistry journals in comparison with ES ranking.

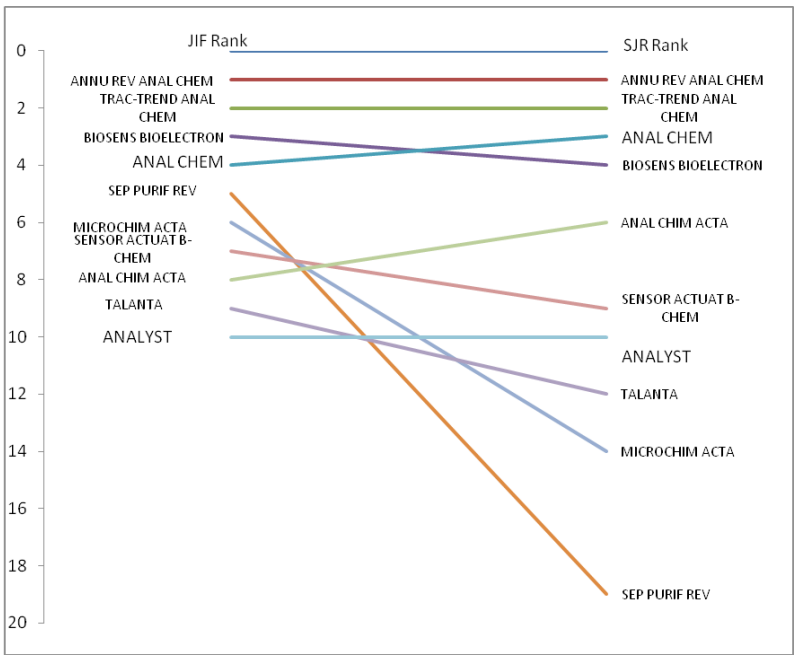

Figure 2. Bump chart for top ten (10) JIF ranked analytical Chemistry journals in comparison with SJR ranking.

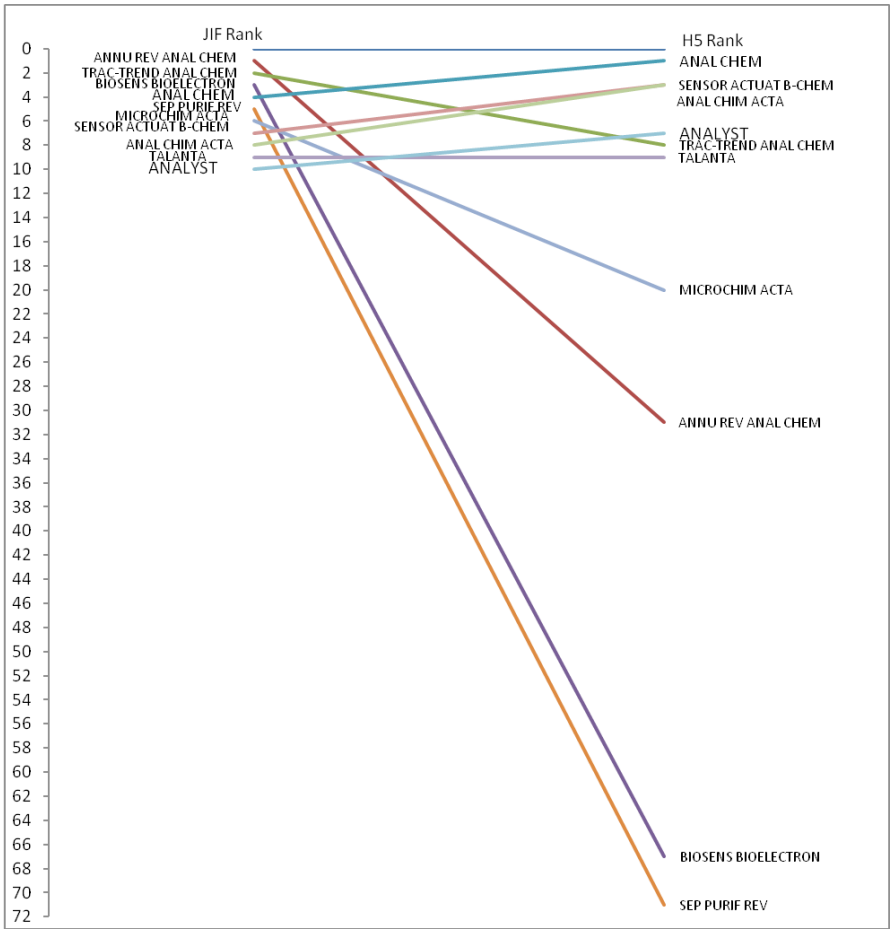

Figure 3. Bump chart for top ten (10) JIF ranked analytical Chemistry journals in comparison with H5 ranking.

Table 2. Bivariate correlation between three indicators for ranking of analytical Chemistry journals

Correlation statistic	Coefficient value	Sig.
Pearson's r between JIF and ES values	0.558	.000
Pearson's r between JIF and SJR values	0.936	.000
Pearson's r between JIF and H5 values	0.567	.000
Spearman's rho between JIF and ES rankings	0.763	.000
Spearman's rho between JIF and SJR rankings	0.946	.000
Spearman's rho between JIF and H5 rankings	0.728	.000

Figure 4 shows the correlation among JIF, ES and SJR (values and rankings) as well as their fit and trend lines for the seventy five (75) Analytical Chemistry journals through scatter plots.

The results revealed that the use of SJR index does not remarkably alter the framework order of journals as compared to the JIF or its technique of calculation. Since SCImago Journal and Country Rank is free access, this suggests that SJR may be considered as an alternative to the JIF. This finding is in agreement with that drawn by García-Pachón and Arencibia-Jorge, 2014[10].

The linear relationship and matching pattern between values and ranks attains its continuity and consistency

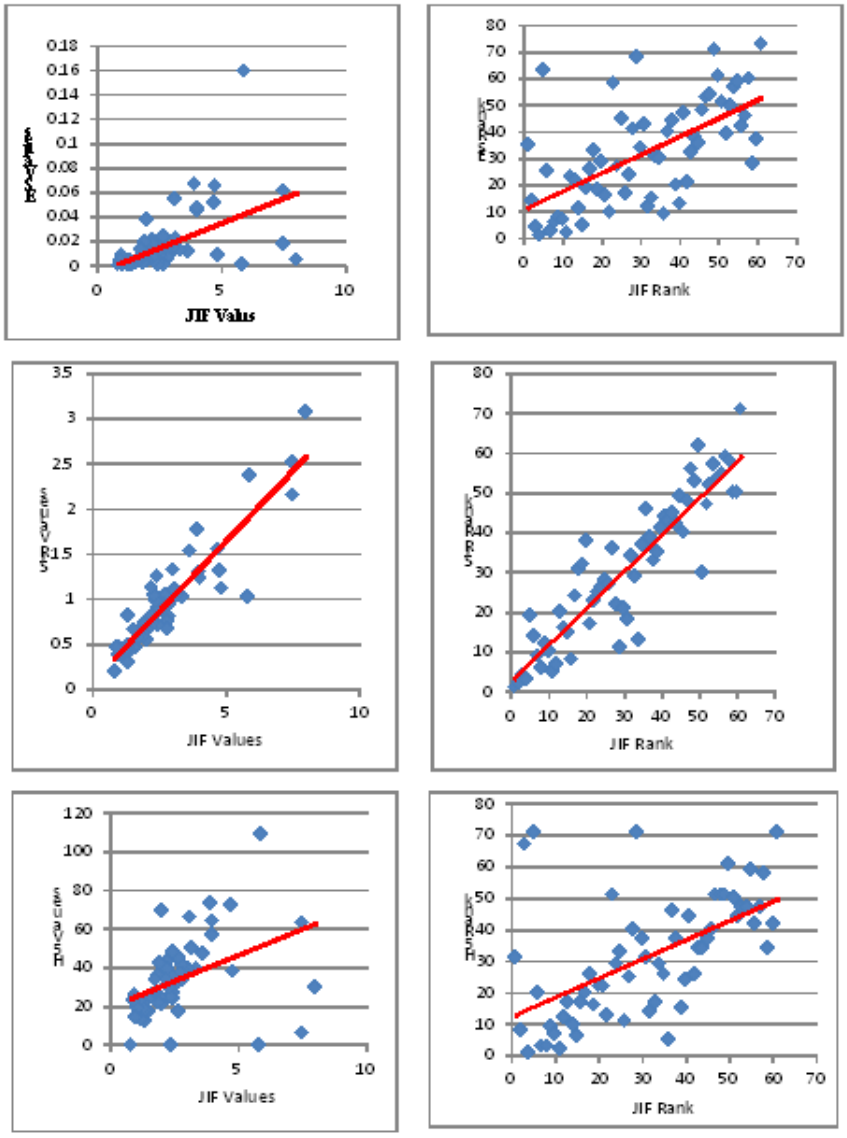

Figure 4. Scatter plots showing correlation between JIF, ES and SJR (values and rankings) as well as their fit lines for 75Analytical Chemistry journals.

for the three indices (ES, SJR and H5) with JIF, Similarly, the increasing trend in quality suggested by a vital harmony between the four indices in the case of analytical chemistry journals. A theme that merits further research and consideration to pinpoint governing footprints, if any,

5. Conclusions

In summary, while journal impact factor is considered as an index of journal quality, it has some limitations. Some of the Analytical chemistry journals are Scopus indexed only. In that case the SJR indices were used. In this work, the four indices JIF, SJR, ES and H-index were used to know the quality of Analytical chemistry journals. Combination of JIF and SJR ranking revealed that this is the best prestige and impact of wide-based Analytical chemistry journals. The authors suggest that this type of combination can be applied for the other scientific journals in the future work which help to know the reputation and quality of journals. Pearson's statistic correlation between JIF and SJR values reached a high value (0.936) as compared its relation to either ES (0.558) or H5 (0.567). The same results is observed for the relationship of Spearman's rho between JIF and SJR rankings (0.946) to yet droop to its correlation with either ES (0.763) or H5 (0.728).

6. References

1. Ascaso F.J. (2011). Impact factor, eigenfactor and article influence. Arch Soc Esp Oftalmol, 86:1–2. https://doi.org/10.1016/j.oftal.2010.12.005. PMid:21414522.
2. Garfield E. (2006). The history and meaning of the journal impact factor. JAMA,295:90–93. https://doi.org/10.1001/jama.295.1.90. PMid:16391221
3. Seglen P.O. (1997). Why the impact factor of journals should not be used for evaluating research. BMJ, 314:498–502. https://doi.org/10.1136/bmj.314.7079.497. PMid:9056804, PMCid:PMC2126010.
4. Postma E. (2007). Inflated impact factors? The true impact of evolutionary papers in non-evolutionary journals. PLoS One, 2:e999. https://doi.org/10.1371/journal.pone.0000999. PMid:17912376 PMCid:PMC1994586.
5. Motamed M.; Mehta D.; Basavaraj S. and Fuad F. (2002). Self citations and impact factors in otolaryngology journals. Clin Otolaryngol Allied Sci., 27:318–20. https://doi.org/10.1046/j.1365-2273.2002.00574.x. PMid:12383288.
6. Mario Cantín M.; Mu-oz and Ignacio Roa. (2015). Comparison between Impact Factor, Eigenfactor Score, and SCImago Journal Rank Indicator in Anatomy and Morphology Journals, Int. J. Morphol., 33(3):1183–88. https://doi.org/10.4067/S0717-95022015000300060.
7. Ramin S. and Sarraf Shirazi A. (2012). Comparison between Impact factor, SCImago journal rank indicator and Eigenfactor score of nuclear medicine journals. Nucl. Med. Rev. Cent. East Eur., 15(2):132–36. PMid:22936507.
8. Kianifar H.; Sadeghi R. and Zarifmahmoudi L. (2014). Comparison between Impact Factor, Eigenfactor Metrics, and SCimago Journal Rank Indicator of Pediatric Neurology Journals. Acta Inform. Med., 22(2):103–6. https://doi.org/10.5455/aim.2014.22.103-106. PMid:24825934 PMCid:PMC4008039.
9. Zarifmahmoudi L.; Jamshid Jamali J. and Sadeghi R. (2015). Google Scholar journal metrics: Comparison with impact factor andSCImago journal rank indicator for nuclear medicine journals. Iran J. Nucl. Med., 23(1):8–14.
10. García-Pachón E. and Arencibia-Jorge R. (2014). A Comparison of the Impact Factor and the SCImago Journal Rank Index in Respiratory System Journals. Arch Bronconeumol, Letters to the Editor, 50:308–09. https://doi.org/10.1016/j.arbres.2013.10.006. PMid:24315384.