

# The Impact of Brazilian Scientific Articles Published in Domestic and Foreign Journals Indexed in Web of Science

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## Introduction

Only recently the international data bases have included a more significant number of scientific journals published in developing countries. Before that, the knowledge of the production from these nations was restricted almost exclusively to what was published in journals in the developed countries. Concerning to Brazil, it is estimated that only 20% of the researches are published on international journals (FIGUEIRA, JACQUES & LETA, 2003).

Besides the increase in visibility of the Brazilian journals with the indexing in the international data bases, we notice an increase in the knowledge about the characteristics of the Brazilian scientific production. This is due to the tools available on the data bases, and to the integration of the articles published in the developing countries to the wide range of scientific production that consists of the mainstream scientific scenario.

This work made use of the increase in the journal coverage and the development of new analytical tools in the data base Web of Science (WoS) produced by Thomson Reuters and has the aim of comparing the impact of the Brazilian scientific production published in domestic and foreign journals, having as analysis parameters: (1) the average values of IF observed in the journals of the respective subfields; (2) the influence of the foreign collaboration in the average number of citations received by the articles.

## Materials and methods

The articles selected for this study were those which stated some affiliation with Brazilian Institutions, which were published in journals pertaining to subfields in which at least one Brazilian journal is indexed by the Journal Citation Report (JCR) during the period of 2002-2006. Within this criterion, 20 subfields were identified for doing this study, as it is shown in Table 1.

The investigated sample consisted of articles selected from this set of journals, following search

with the term "brazil" in the affiliation indication. A total of 36.899 articles were found and grouped by subfield in order to calculate the Impact Factor for the Brazilian articles (IF-BR) in several subject areas.

For the IF calculation, a five-year citation window was used following the same formula available in the 2007 JCR edition. That is to say, the IF is the ratio between the number of citations appearing in 2007 to the items published in the last five years and the number of articles (source items) published in those five years. Such a window was considered more appropriate than the currently used two-year window since the averaged half-life of the investigated subfields is about 7.36 years. The productivity and citation data were obtained by using the result analysis and citation report tools of WoS.

The study of the impact of the Brazilian articles published in both domestic and international journals was done from the analysis of the percentage of correspondence between measures in two levels: (1) the ratio between the IF-BR and the five-year averaged IF of the correspondent subfield of JCR; (2) the ratio between the IF-BR for the articles without foreign collaboration and the IF-BR for articles with foreign collaboration.

## Results

As it is shown in Table 1, there is a significant difference between the IF-BR for domestic and foreign papers. The IF-BR of the articles published in domestic journals is below the average IF of the correspondent subfield. The closest to the average are Tropical Medicine and Mathematics, with percentage of correspondence of about 60%. In the articles published in foreign journals, the IF is much better. We notice that in seven branches the IF-BR is higher than the IF of the subfields. It should be noted that the subfield classified as Multidisciplinary Sciences has the IF about three times higher than the average. It is remarkable the fact that for this area, in addition to the Multidisciplinary Agriculture and Veterinary Sciences, the differences between IF of articles published in domestic and foreign journals are more expressive. This way, we can assure that the

Brazilian Scientific production is cited more often when it is published in foreign journals in all the subfields studied.

**Table 1- Percentage of correspondence between the IF-BR of the Brazilian papers published in domestic and foreign journals and the average IF (5 years) of the subfield.**

Subfields	Avg IF (5-Year) in 2007	IF - BR	
		$IF_{avg}(subfield)$	
		Domestic (%)	Foreign (%)
Agriculture, Dairy & Animal Science	1,142	37,19	95,85
Agriculture, Multidisciplinary	0,826	36,40	<b>212,84</b>
Biochemistry & Molecular Biology	3,802	15,77	55,77
Biology	2,169	36,89	69,53
Chemistry, Multidisciplinary	2,275	41,39	<b>106,97</b>
Engineering, Chemical	1,183	43,66	<b>118,48</b>
Genetics & Heredity	3,904	15,36	55,05
Mathematics	0,734	<b>61,94</b>	80,41
Medicine, Research & Experimental	2,883	36,73	86,73
Microbiology	3,319	11,86	69,68
Multidisciplinary Sciences	2,463	33,15	<b>340,32</b>
Neurosciences	3,589	12,98	65,36
Parasitology	2,207	52,28	69,61
Physics, Multidisciplinary	2,544	15,06	93,15
Psychiatry	3,025	15,57	82,62
Public, Environmental & Occupational Health	1,823	26,74	82,89
Social Sciences, Interdisciplinary	0,866	11,22	38,48
Soil Science	1,570	32,15	<b>107,56</b>
Tropical Medicine	1,495	<b>63,09</b>	<b>103,27</b>
Veterinary Sciences	0,954	37,00	<b>142,02</b>
Median	2,19	34,77	84,81

Table 2 shows the data about the influence of the foreign collaboration in the impact of the articles published in domestic and foreign journals. Proceeding to the analysis of the results, we observe that the difference between IF-BR for articles with and without foreign collaboration is significantly smaller when the articles are published in domestic journals. In subfields such as Multidisciplinary Chemistry, Chemical Engineering and the Multidisciplinary Sciences, the IF-BR of the articles without foreign collaboration published in domestic journals is even higher than those written with authors from other countries. On the contrary, there is a tendency for IF-BR to be higher for articles published in foreign journals when the studies are elaborated along with foreign researchers. Only in Multidisciplinary Agriculture the articles without collaboration in foreign journals have a little higher IF-BR, but this branch is an exception. In contrast, in the foreign journals, the IF-BR values of the articles on Multidisciplinary Sciences and Interdisciplinary Social Sciences are the ones which are more influenced by the collaboration from other countries. Similar results on the influence of foreign collaboration over the IF of the Brazilian articles published in prestigious journals were obtained by Meneghini, Packer and Nassi-Calló (2008).

**Table 2 – Percentage of correspondence of the IF-BR of the articles written without foreign collaboration in relation to the ones written with**

**foreign collaboration, published in domestic and foreign journals.**

Subfields	$IF - BR_{withoutcollab}$ $IF - BR_{withcollab}$	
	Domestic	Foreign
Agriculture, Dairy & Animal Science	0,421 / 0,500 ( 84,18 % )	0,806 / 1,448 ( 55,66 % )
Agriculture, Multidisciplinary	0,290 / 0,456 ( 63,69 % )	1,811 / 1,700 ( <b>106,51 %</b> )
Biochemistry & Molecular Biology	0,550 / 0,945 ( 58,21 % )	1,675 / 2,982 ( 56,18 % )
Biology	0,758 / 1,148 ( 66,01 % )	1,062 / 2,206 ( 48,14 % )
Chemistry, Multidisciplinary	0,949 / 0,863 ( <b>109,99 %</b> )	2,165 / 3,024 ( 71,59 % )
Engineering, Chemical	0,531 / 0,419 ( <b>126,51 %</b> )	1,378 / 1,481 ( 93,03 % )
Genetics & Heredity	0,550 / 0,945 ( 58,21 % )	1,256 / 3,450 ( 36,41 % )
Mathematics	0,440 / 0,474 ( 92,89 % )	0,504 / 0,685 ( 73,67 % )
Medicine, Research & Experimental	1,016 / 1,365 ( 74,42 % )	1,547 / 4,580 ( 33,77 % )
Microbiology	0,391 / 0,419 ( 93,31 % )	1,646 / 3,308 ( 49,75 % )
Multidisciplinary Sciences	0,910 / 0,526 ( <b>172,82 %</b> )	1,273 / 12,496 ( 10,19 % )
Neurosciences	0,447 / 0,780 ( 57,38 % )	1,920 / 3,377 ( 56,85 % )
Parasitology	1,102 / 1,377 ( 80,05 % )	1,334 / 1,930 ( 69,12 % )
Physics, Multidisciplinary	0,362 / 0,464 ( 77,99 % )	1,109 / 4,006 ( 27,68 % )
Psychiatry	0,451 / 0,763 ( 59,10 % )	1,617 / 3,827 ( 42,26 % )
Public, Environmental & Occupational Health	0,451 / 1,081 ( 41,69 % )	1,027 / 2,175 ( 47,22 % )
Social Sciences, Interdisciplinary	0,097 / 0,100 ( 96,77 % )	0,139 / 0,917 ( 15,15 % )
Soil Science	0,498 / 0,600 ( 82,92 % )	1,441 / 1,899 ( 75,86 % )
Tropical Medicine	0,879 / 1,311 ( 67,04 % )	1,219 / 2,032 ( 60,02 % )
Veterinary Sciences	0,350 / 0,393 ( 89,06 % )	1,137 / 1,884 ( 60,34 % )

Thus, we conclude that usually, the Brazilian scientific production which has the highest impact is the one published in foreign journals and written in collaboration with authors from other countries.

## References

- Figueira, I., Jacques, R., & Leta, J. (2003). A comparison between domestic and international publications in Brazilian psychiatry. *Scientometrics*, 56(3), 317-327.
- Meneghini, R., Packer, A., & Nassi-Caló, L. (2008). Articles by Latin American Authors in Prestigious Journals Have Fewer Citations. *PLoS ONE*, 3(11), e3804.

<sup>1</sup> The complete search query was “brasil OR brazil”, for address; “2002-2006”, for year published; NOT “Meeting Abstract OR Meeting Summary OR Meeting-Abstract”, for document type.

<sup>1</sup> Articles published in journals classified in more than one WoS subfield are counted according to the number of subfield.;

<sup>1</sup> The five-year average was calculated, for each subfield, from the 2007 JCR edition.