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Editorial and publication delay of papers submitted to 14 selected Food Research journals. Influence of online posting

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Introduction: Publication delay, chronological distance between completion of a scientific work and distribution of its achievements as a peer reviewed paper, is a negative phenomenon in scientific information dissemination. It can be further subdivided in successive stages corresponding to the peer review process and the technical preparation of accepted manuscripts. Formal online posting in electronic versions of journals has been considered as a shortening of the process.

Objectives: To determine publication delay in a group of leading Food Research journals, as well as factors affecting this lag and also to compute the effect of formal online posting on the distribution of papers in electronic form. Secondary objective is also to study the possible effect of informal posting of papers through some repositories on the publication delay in the field.

Methods: 14 Food Research journals were selected and 4836 papers published in 2004 were examined. Dates of first submission, submission of revised manuscripts, acceptation, online posting and final publication were recorded for each paper.

Analysis: Data collected were analyzed using SPSS and SigmaPlot. Parametric correlation between some variables was determined and ANOVA was performed with BMDP package for significance analysis of differences among journals.

Results: average publication delay of papers submitted to the set of selected journals is 348 ± 104 days, with *European Food Research and Technology* and *Journal of Agricultural and Food Chemistry* showing the shortest delays. Total delay strongly depends on the peer review process. On average, 85.75% of manuscripts are corrected prior to their acceptance by journals. Online

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posting of papers prior to their print publication reduces total delay in about 29%. On average, a paper is posted online 260 days after its submission to the set of journals.

Conclusions: Publication delay of papers is strongly dependent on the peer review process, which affects most of the manuscripts in the Food Research field. Advanced online publication through formal posting at the editor's sites only slightly reduces the time between reception and final publication of papers.

Introduction

Scientific publication process through peer reviewed serials can be viewed as a chronological continuum. Starting with reception of manuscripts, several landmarks identify successive stages: review of first and later versions of the work, acceptance in its final form, online posting of electronic versions and print publication being major milestones. The chronological distance between completion of a scientific work and distribution of its achievements as a peer reviewed paper, referred as publication delay, lapse or lag is part of a wider chronology, which expands from hypothesis formulation to actual delivery of scientific outcome to readers. The whole process was dealt with in one of the seminal papers on this subject [GARVEY & GRIFFITH, 1964] while later work have studied mainly the pre-publication [PASK, 1988; ROLAND & KIRPATRICK, 1975] and the post-publication stages [CARSON & WYATT, 1983; DIÓSPATONYI & AL., 2001B].

Publication delay, the central chronological period in the process, is generally perceived as a negative factor in information dissemination because its influence on the priority reward [STREVENS, 2003] associated with publication of original or novel scientific ideas.

Therefore, on the publisher's side, a clear interest in reducing publication delay is revealed by commercial slogans like Accelerating the World of Knowledge (Kluwer, now Springer) or Tomorrow's Research, Today (Taylor and Francis). Also, progressive adoption of systems (early view, preview, e-first and so on) to disseminate research papers before their print appearance has been generalized among scientific literature aggregators and vendors.

On the authors' side, several surveys have been conducted whose results are controversial. One of them has revealed that publication speed is not a priority for researches when facing potential advantages of electronic editions [SWAN & BROWN, 2003] while this issue is emphasized by others [BHATTACHARJEE & AL., 2004; EUROPEAN COMMISSION, 2002; SCHROTER & AL., 2005]. An early survey with journal editors in the neurology and basic biomedicine fields appeal to journal changes as the only way to avoid large publication lags, mainly attributable to the ins of peer review process [YOKOTE & UTTERBACK, 1974]. Some biases have been identified in this process: age-related, gender, institutional, conflict of interest and geographical among others [VAN ROOYEN, 2001]. STERN & SHIMES [1997] have also found a relationship between results of clinical trials and delay of publication as journal papers.

A large amount of studies from a wide range of disciplines and sub disciplines have tried to quantify and explain factors associated with publication lag. Works have been devoted to Psychology [GARVEY & GRIFFITH, 1964] Analytical Chemistry [BRAUN & AL., 2001; DIÓSPATONYI & AL., 2001A; DIÓSPATONYI & AL., 2001B] Medical Microbiology [CARSON & WYATT, 1983] Econometrics [TRIVEDI, 1993] Information Systems [BHATTACHARJEE & AL., 2004] and Biomedicine [DONG & AL., 2006] research literatures and the patenting systems [ADAMS, 2003] among others.

From the documentation and library science field, publication lag has been considered an indicator of journal quality [DIÓSPATONYI & AL., 2001A; SITTIG & KAALASITTIG, 1995; TOBIN, 2004] and its effects on several bibliometric indicators have been disclosed. [EGGHE, 2000] shows that observed aging curves are influenced by publication delays. Luwel argues that the cited half-life of references may be reduced with a factor of about 2 if publication delays decrease radically [LUWEL, 1998]. And [SEGLEN, 1997] claims that short publication lag allows many short term journal self citations and gives a high journal impact factor. The most recent contributions by information scientists to the subject surpasses the descriptive level. So, after a complete set of work devoted to mathematical modelling of delay, Yu has studied information loss caused by delay in publication of Chinese scientific journals [YU & LI, 2006]. Atin and Pritha Das focused their work on the distance between online and print publication of papers and its effects over research in developing (i.e.: under the digital divide) countries [DAS & DAS, 2006]. The influence of the publishing model on delay has been analyzed by Dong et al. in search of the effect of electronic technologies in speeding up publication [DONG & AL., 2006].

Recent work relates publication delay with advances in electronic methods of editing and publishing scientific journals. One common (if not general) assumption about electronic edition is that "Onward transmission to the editors of learned journals is also more readily achieved by electronic file transfers, and the editorial refereeing process can be more expeditiously done. (…) It speeds ups the process of review wonderfully so that publication can be achieved much more speedily" [WILLS & WILLS, 1996]. Some evidence against this assumption has been reported [KLING & SWYGART-HOBAUGH, 2002; DONG & AL., 2006] as well as some favourable experience [TOBIN, 2004].

Main objective of this work is to compute publication delay in the Food Research literature and to find what factors or components are determinant in it. Secondary purposes are to provide some figures on the scientific publication process in the field and to find if journals editorial practices conform with the concern of priority acknowledgement of scientific authors. This work also investigates if the existence of some thematic repository in the Food Research field could improve information dissemination in the area, shortening the period of formal online posting and publication on manuscripts.

Sources and method

Definitions and variables

Total publication delay is defined as the chronological distance between the stated date of reception of a manuscript by a given journal and its appearance on any print issue of that journal. Two main components of this period have been differentiated [DIÓSPATONYI & AL., 2001B]: the editorial stage reflects the process of peer review of the manuscript and its limits are the date of receipt and the date of acceptation; technical stage expands between this later date and the effective publication date. Editorial stage can be further subdivided into two periods: the first one expands between submissions of papers in its original form to reception of reviewed manuscripts. This is followed by the period of editorial consideration of changes and definitive acceptation. By means online posting, full content of a paper is made available to readers through remote connection, usually some time before its effective online or print appearance on a journal issue. In the context of this work, only formal posting at the editor site is considered effective online posting. Sources of information on all dates have been electronic abstracts pages as well as print editions of journals.

Journal selection and papers studied

Food Research is not a homogeneous research area. Several fields are concerned with: Analytical Chemistry, Polymer and Materials Science, Applied Microbiology and Biotechnology, Food Technology and Processing, Toxicology, Clinical Microbiology and Nutrition, among others. Although there are several hundred journals focused in or related to Food Research literature, only 14 were selected for this study, based in Thompson's ISI Food Research and Technology category. Main selection criteria were number of papers published in 2004. Journals selected, with some of their editorial and publication characteristics, are listed in Table 1.

To avoid invited submissions or those subjected to some special publication calendar, correspondence and rebuttal, errata and corrigenda as well as some manuscripts derived from meeting communications were discarded as sources.

Determination of dates

All papers were examined in electronic and/or printed form. For each one five dates (where possible) were manually recorded: 1) reception of manuscript; 2) reception in reviewed version; 3) acceptation; 4) online posting, and 5) publication. This analytical scheme coincides with that used by [DONG & AL., 2006].

Table 1. Journals selected

Journal	Institutional Publisher	Vendor/Aggregator
Cereal Chemistry	American Association of Cereal Chemists	AACC
European Food Research and Technology	FECS / Division of Food Chemistry	SpringerLink
Food Additives and Contaminants	International Society for Mycotoxicology	Taylor and Francis
Food Chemistry		ScienceDirect
Food and Chemical Toxicology		ScienceDirect
International Journal of Food Microbiology	International Committee on Food Microbiology and Hygiene	ScienceDirect
Journal of Agricultural and Food Chemistry	American Chemical Society	ACS
Journal of Dairy Science	American Dairy Science Association	HighWire Press
Journal of Food Engineering		ScienceDirect
Journal of Food Protection	International Association for Food Protection	IngentaConnect
Journal of Food Science	Institute of Food Technologists	IFT
Journal of the Science of Food and Agriculture	Society of Chemical Industry	InterScience
Meat Science	American Meat Science Association	ScienceDirect
Postharvest Biology and Technology		ScienceDirect

Exact date of publication of issues could be determined only for some journals. In other cases, date of publication was estimated: 1) as the 15th day of each month for monthly journals, and 2) as the first day of the second month for bimonthly journals. In irregular journals (i.e. those with 18 or 15 issues per year) date of publication was distributed among the yearly period. While date of reception, date of acceptation and date of publication were collected without problem in most cases, it was not possible to determine review and online posting dates in some cases. *European Food Research and Technology* represented a special case for date of acceptation of manuscripts was not stated at all.

Results and discussion

General data

In Table 2, journals selected are listed alphabetically. Columns contain number of papers published in 2004 and descriptive figures for some variables: editorial delay (EditD) technical delay (TecD) and total publication delay (TotD). On average, any of the 4836 papers is published 348 ± 104 days after its submission to the set of periodicals studied. In 5 out of the 14 journals considered, average total publication delay surpasses one year. In general terms, half of papers ought to wait 330 days to be published after manuscript was received by editorial teams. *European Food Research and Technology* (188.58 ± 51.53) and *Journal of Agricultural and Food Chemistry* (204.94 ± 65.3) are the journals with the shortest publication period on average and both *Journal of Dairy*

Science (299.47 ± 65.3) and *Food Additives and Contaminants* (270.87 ± 122.1) fall also below the average total delay. These figures contrast with those of Dong et al. who estimates delay in three groups of biomedical journals in 137, 157 and 270 days on average for Nature Publishing Group, BioMed Central and a set of learning societies journals respectively [DONG & AL., 2006].

Table 2. General results (figures in days)

Journal	Papers	EdiD			TecD			TotD		
		Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
CerealChem	127	166.27	73.73	154.5	198.23	48.89	199	364.53	86.53	367.5
*EurFoodRes**	192							188.28	51.53	181
FoodAddit	126	167.82	105.26	149	102.98	67.28	96	270.8	122.1	251
FoodChem	419	135.85	72.27	125	300.32	55.76	293	436	87	419
FoodChemToxicol	199	137.44	88.06	117	152.72	20.68	153	288.53	91.59	268.5
IntJFoodMicrobiol	255	206.1	104.88	188	240.92	66.52	231	447.16	124.96	428
JAFC	1262	128.7	61.71	116	76.27	15.6	73	206.83	65.3	191
JDairySci	493	129.46	91.77	106	169.97	57.3	157	299.47	109.87	277
JFoodEngin	318	196.24	136.14	160	323.91	34	317	522.24	134.38	491
JFoodProt	421	124.11	51.71	115	170.7	29.64	166	294.81	59.65	280
JFoodSci	334	119.34	75.8	101	137.44	41.84	129	256.89	89.79	238
JSciFood	286	321.39	201.64	292	171.55	49.94	167	493.42	201.62	449
MeatSci	275	167.56	103.32	151	255.86	56.38	244	423.49	112.21	413
Postharvest	129	194.94	117.81	179	188.05	21.98	187	382.42	119.77	372

*No date of manuscripts acceptation provided.

Table 2 also offers a first glance to the relationship between editorial and technical stages in the publication process. In general, technical delay (TecD) seems to be greater than editorial delay (mean values of 191.51 and 168.83) but this is not true for all journals and average figures could be affected by the long technical stages of *Food Chemistry*, *Journal of Food Engineering* and *Meat Science*.

Lack of information on date of acceptation of manuscripts submitted to European Food Research and Technology has made impossible to compute length of editorial and technical stages for this journal.

As shown by ANOVA testing, differences in editorial delay (EditD) are not significant among the group of journals with the shortest lags, from *Journal of Food Science* to *International Journal of Food Microbiology* but these differences are statistically significant with the rest of journals, those above the mean editorial delay. Regarding the remain variables, either total delay (TotD) and technical delay (TecD) show significative differences among the whole set of journals except between *Journal of Food Protection* and *Journal of the Science of Food and Agriculture* regarding technical delay of papers. *European Food Research and Technology* and *Journal of Agricultural and Food Chemistry* are significantly the journals with the shortest total publication delay.

What publication delay depends on?

For each paper and journal, correlation has been studied between length of editorial stage (EditD) and total publication delay (TotD) and also between extent of the technical period (TecD) and total delay. Table 3 shows correlation coefficients for both editorial and technical stages. Two-sided Spearman coefficient was used, as all three variables passed normality test (K-S). It seems clear that editorial delay fits pretty well to total publication delay (with coefficients ranging from 0.983 to 0.771) and that technical stage is less associated with it (0.125 to 0.565). As in other distributions it has been not possible to compute data from *European Food Research and Technology*.

Table 3. Correlation coefficients between editorial and technical periods and total publication delay

Journal	EditD vs. TotD	TecD vs. TotD
Cereal Chemistry	0.825	0.523
European Food Research and Technology		
Food Additives and Contaminants	0.824	0.51
Food Chemistry	0.771	0.565
Food and Chemical Toxicology	0.974	0.237
International Journal of Food Microbiology	0.845	0.544
Journal of Agricultural and Food Chemistry	0.971	0.339
Journal of Dairy Science	0.854	0.552
Journal of Food Engineering	0.969	0.142*
Journal of Food Protection	0.868	0.498
Journal of Food Science	0.887	0.546
Journal of the Science of Food and Agriculture	0.972	0.125*
Meat Science	0.867	0.406
Postharvest Biology and Technology	0.983	0.193*

* Marked figures significant at $p<0.05$. All other coefficients were significant at $p<0.01$

Review of manuscripts

Some interesting figures can be drawn from Table 4. Columns 1 to 3 express the percentage of papers modified through the peer review process for all but four journals where data on reception of corrected manuscripts were not available. On average, 70 per cent of manuscripts are modified prior to their acceptation by editorial teams. Figures for *Food and Chemical Toxicology* and *Journal of Food Engineering*, rather low, could be discarded. The remain publications offer an average percentage of 85.75: only 15 out from every 100 papers are published without corrections in the set of journals studied. These being major or minor modifications could not be determined.

Table 4. Editorial process of papers published

Journals	Papers	Corrected	%	EditD-1			EditD-2		
				Mean	SD	Median	Mean	SD	Median
CerealChem	127								
EurFoodRes	192	131	68.23						
FoodAddit	126	119	94.44	158.74	106.66	138	10.45	13.71	7
FoodChem	419	359	85.68	139.19	71.5	129	6.15	33.74	0
FoodChemToxicol	199	13	6.53						
IntJFoodMicrobiol	255	219	85.88	161.84	93.9	142	47.2	47.3	32
JAFC	1262	1186	93.98	118.38	55.73	107	9.04	13.18	4
JDairySci	493								
JFoodEngin	318	32	10.06						
JFoodProt	421								
JFoodSci	334	304	91.02	54.44	32.05	46	65.47	68.14	52
JSciFood	286	246	86.01	272.73	170.04	231	65.67	84.46	38
MeatSci	275	222	80.73	155.28	94.24	135	18.74	46.26	4
Postharvest	129								

Table 4 also compares the two sub stages of editorial period. Average distance between first reception of manuscripts and reception of latest revised version (EditD-1 = 151.51 ± 89.16 days) surpasses the time to judge and accept these later versions (EditD-2 = 31.82 ± 43.83 days on average). In *Food Chemistry*, half of revised manuscripts are accepted the same day they are submitted in corrected form.

Reduction of delay by formal online posting

To determine the effect of online posting at the publisher's site on the whole publication process, two measures have been computed (see Table 5). It was not possible to gather data from papers published in four journals as neither online nor printed editions inform on the date of advanced online posting of them.

Mean reduction of total publication delay is about 29%. Higher percentages correspond to *Journal of Food Engineering*, *Food Chemistry*, *Meat Science* and *Food and Chemical Toxicology*, all journals distributed by Elsevier's ScienceDirect online system. In contrast, *Postharvest Biology and Technology*, another journal of Elsevier's group, shows one of the minor percentages of reduction through online posting. There's no relationship ($r = 0.177$, $p < 0.05$) between these figures and those corresponding to total publication delay. A second set of measures relates date of first submission of manuscripts with date of online posting. If it is assumed that manuscripts could be posted online through some sort of thematic or institutional repository, then they would be accessible at the same time authors send it to journals, about the date of submission.

In Table 5, average differences between date of posting and date of submission are expressed, in days, at the right column. The shortest period (133.4 days) correspond again to *European Food Research and Technology* while average value is around 260 days. It is the time authors could significantly gain through informal posting of their manuscripts at some online repository.

Table 5. Effect of formal online posting

Journal	Percentage[a]			Relative delay (days)		
	Mean	SD	Median	Mean	SD	Median
CerealChem						
EurFoodRes	30.00	9.90	29.74	133.74	49.87	125.00
FoodAddit						
FoodChem	47.35	12.39	48.07	235.67	96.64	221.00
FoodChemToxicol	37.06	11.61	36.36	189.86	91.88	166.00
IntJFoodMicrobiol	28.68	14.23	30.03	330	144.72	299.00
JAFC	16.16	7.54	15.22	215.77	61.16	210.00
JDairySci						
JFoodEngin	52.14	12.45	54.77	262.48	146.11	221.00
JFoodProt						
JFoodSci	9.15	5.77	9.41	232.49	89.28	211.00
JSciFood	14.29	7.57	12.42	433.54	201.17	393.50
MeatSci	46.35	11.85	45.32	236.88	111.80	214.50
Postharvest	14.40	6.38	12.72	330.09	121.96	312.00

[a] Percentage reduction of total delay by formal posting of accepted papers

Conclusions and some prospects

Publication delay in the group of journals studied depends mainly on the peer review stage of the scientific publication process. This finding is contrary to the results disclosed by Dióspatonyi et al. in their analysis of Analytical Chemistry journals [DIÓSPATONYI & AL., 2001B] and can be attributable to some progress in the technical management of accepted manuscripts. There is not a full compliance of chronological data regarding papers submitted to the core of Food Research journals studied. Fortunately, *European Food Research and Technology* has by now fixed the lack of information on date of acceptation of manuscripts. However other journals don't include the intermediate dates of revision of successive versions of the manuscripts they publish and the date when they post them online. On the other part, if journals published data about amount of papers received (the so called editorial pressure), proportion of rejected papers and other issues, the kind of analysis here proposed would be more fruitful and our knowledge about the whole scientific publication process through peer reviewed journals would be better. Excellent editorial reports from *Journal of Dairy Science* [NICKERSON, 2004; ROGERS, 2006] are the only exception.

Only continuous follow-up of variables here studied can determine if publication delay is reduced in the future. However, its dependency on the peer review process may suggest that automation of technical processes is not an issue regarding reduction of delay. Recent proposals to have patent examiners be helped by a "web-based peer review system of scientific experts ruling on innovation" [NOVEK, 2006] must take results of this and other related works into account.

According with the results of this work and other findings [DAS & DAS, 2006] reduction of delay through formal posting of accepted manuscripts seems not to contribute to rapid dissemination of research results. Establishing some repositories in the field is the soundest possibility to achieve a timely distribution of manuscripts in form of pre-prints.

There can be a subjective factor in publication delay. Comparing figures from papers submitted to the same journals by the same research groups along some period could demonstrate the impact of some sort of "author's learning" on delay. However, there could be also a "prestige factor" influencing rapid acceptation of manuscripts from a recognized research group.

Relationship between rapid or immediate acceptation of a paper and its later "impact" on the research field (compared with that of papers long time queued) is also worth to study regarding the efficiency or accuracy of the peer review process. Finally, comparing data from the quickly accepted set of manuscripts with the set of long delayed ones could be a useful method to determine eventual biases (national, for instance) in editorial treatment of scientific works in the field.

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