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Patent Coverage by Abstracting Services. 4. Coverage of Microbiological Patents

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The paper reports a study on the coverage by seven major abstracting services in the field of microbiology in regard to patents. Only three of the services—*Chemical Abstracts*, *Microbiology Abstracts, Section A*, and *Food Science and Technology Abstracts*—cover patents at all. We assessed the three services in terms of the information they provide about patents and then in terms of their performance in retrieving patents taken from a master list of patents on genetic engineering and Vitamin D, obtained by searches on *World Patents Index*. Timeliness of the three services was also assessed. We found that none of the standard abstracting services in the field cover patents satisfactorily and they are slow in picking up patents. The research demonstrates that by scanning just Japanese, Soviet, U.S., and British patents, both timely and comprehensive coverage of the microbiological patent literature can be obtained.

INTRODUCTION

Industrial processes involving the use of microbiological processes or products are many and varied. There is a long history of patenting of such processes and products. The recent controversy over the patentability of genetic engineering processes has resulted in an increased awareness of the importance of microbiological patents, that is, patents which are in some way concerned with microorganisms. With this in mind, we carried out a study to assess the coverage of microbiological patents by major abstracting services and suggest methods by which such abstracting services can improve their coverage with a minimum of expense.

This paper is one of a series from this Centre which have had as their object the demonstration of the importance of patents as sources of information and the coverage of patents by abstracting services in a variety of subject areas.[1-7] The results of these studies have been confirmed by research originating from outside the Centre.[8-11] Most of the previous research has concerned itself with chemical patents but has been used to draw the overall conclusion that patents are a useful source of information for the whole of science and technology. On the basis of the results obtained for other subject areas, the following conclusions regarding microbiological patents can probably be made: a significant proportion of useful microbiological information is disclosed in patents and not in any other form of literature; even when the information is duplicated in (say) the journal literature, it will have appeared in the patent literature much sooner, unless the patent has appeared only in the U.S. Most major patent-issuing authorities in the world have adopted the "deferred examination" system, which leads to quick publication, but the U.S. has not done so.

Others have reached similar conclusions. According to Gollin,[12] the patent literature can be of considerable value to microbiologists. Bannister and Oppenheim[3] concluded from their study that patents represent an important source of information regarding microorganisms. For these reasons, the performance of the major abstracting services in covering microbiological patents should be of concern to all who have to search the microbiological literature. There appears to have been only one statement in the professional literature regarding the performance of abstracting journals in this respect. Turner, in 1967, stated that *Microbiology Abstracts, Section A*, provides excellent coverage of microbiological patents. He wrote that 75% of the journal consisted of patents, and the publishers were said to monitor 25 countries in order to provide this service.[13] Unfortunately, Turner provides no evidence to support these statements. Other statements in the same article regarding the performance of *Chemical Abstracts*[13] have since been demonstrated to be unjustifiably optimistic.[5]

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METHODOLOGY

We looked at seven major abstracting services in the field of microbiology. These were *Biological Abstracts*, *Microbiology Abstracts, Section A*, *Food Science and Technology Abstracts*, *Excerpta Medica: Microbiology*, *Chemical Abstracts*, *Genetics Abstracts*, and *Current Advances in Genetics*. Initially we looked at their policies regarding coverage of patents. Those which did not cover patents were not studied further. For the journals that did cover patents, the nature of their patent coverage was examined in greater depth. We looked at the indexes which allow retrieval of patents, the content of a typical patent citation and the method of handling equivalents. We noted the countries whose patents were covered. We noted the number of patents abstracted per annum and the proportion this represented of their total abstracting effort. We subsequently took a random sample of microbiological patents and used them to estimate the percentage of the microbiological patent literature that is covered by each abstracting service. Where microbiological patents were covered, we carried out an assessment of the timeliness of each abstracting service. The original sample of patents was also used to examine the pattern of filings worldwide. This was done in order to formulate recommendations as to how the services could improve their coverage of patents. Details of the methodology are described later in this paper.

PATENT COVERAGE BY THE MAJOR ABSTRACTING SERVICES

Only three of the seven abstracting journals examined cover patents at all. The three are *Chemical Abstracts* (CA), *Microbiology Abstracts, Section A* (MA), and *Food Science and Technology Abstracts* (FSTA). It might be argued that

0095-2338/81/1621-0124$01.25/0

feature	CA	MA	FSTA
content of the patent citation			
1. patent no.	√	√	√
2. country of issue	√	√	√
3. inventor	√	X	X
4. patentee	√	√	√
5. priority country	√	√	√
6. priority number	√	√	√
7. priority date	√	√	√
8. application number	√	X	X
9. date of filing	√	√	X
10. date of publication	√	√	√
11. IPC	√	X	X
nature of the patent abstract	informative	informative	indicative
nature of the indexes that allow acess to patents			
1. subject	yes	yes	yes
2. name	author (with patentees and inventors)	patentee and assignee	author (inventors)
3. no.	patent no. index	no	no
country coverage			
no. covered fully	17	?	5
no. covered partially	11	?	13
no. covered (full or part)	28	25?	18
number of patents abstracted			
1. no. of items abstracted in 1979 (approx)	400 000	10 000	18 200
2. no. of new patents abstracted in 1979 (approx)	70 000	1 450	6 400
3. proportion of items that are new patents	17.5%	14.5%	35.2%

Figure 1. Major abstracting services that cover microbiological patents: observations.

the other services fail to cover patents because they cover only theoretical topics rather than industry related topics. Certainly *Biological Abstracts* with its sections on Food Microbiology, Microbial Apparatus, etc., and *Current Advances in Genetics* with its section on recombinant DNA cannot offer such explanations. Readers of previous papers emanating from this Centre will not be surprised at our conclusions regarding the abstracting journals that fail to cover patents: they are doing their readers a disservice by their failure to cover this significant part of their literature.

Turning now to the three services that do cover patents, we noted what services they provided in their patent abstracts. The abstracts provided by FSTA tended to be less informative than those provided by CA and MA. Figure 1 summarizes our observations on the three services. According to Freeman and Oppenheim,[2] an abstracting service should provide ideally the following pieces of bibliographic information in its citation to a patent abstract: Application date, publication date, priority date, country, patentee, and patent number. On this basis, CA provides too much information, MA gives just the right amount of information, and FSTA provides too little.

In order to assess the coverage of the three services in a little more detail, we needed a master list of relevant patents. In order to do this, we arranged for two online searches to be run by using the Derwent WPI (*World Patents Index*) database. The searches were run in mid-1980. The technique of obtaining a master list of patents as a yardstick for assessing the performance of abstracting services has been used by us before.[1,2,5] Such a technique requires some justification. Should the WPI database be unreliable, then the coverage of other services will be subjected to an unfair comparison. Patents included by the abstracting service but omitted by WPI will be ignored, and so coverage of the abstracting service in question will be underestimated. In fact, all the evidence points to the reliability of WPI as a master source of patent listings.[14-17] We are grateful to the staff of Derwent Publications for their advice on suitable search strategies. Two searches were run. One was designed to retrieve example of genetic engineering patents involving animal extracts and provided a total of 80 postings. The second search was a broad one covering patents on microbiological research concerning Vitamin D. The 175 most recent references were printed out (the whole search gave 816 hits). While not necessarily claiming that the output of these two searches is a comprehensive listing of all patents on the chosen subjects, we do feel they represent a useful master list against which the performance of other services can be assessed. It should, perhaps, be noted that patents of genetic engineering have only recently been allowed in the U.S. For this reason, the sample of genetic engineering patents probably had a lower proportion of U.S. patents present than might be expected from a more random collection of patents. This, in turn, could possibly distort our results regarding coverage of patents by an abstracting service which specializes in coverage of U.S. patents, but we do not think that such a distortion will be significant.

In order to give the three abstracting services under study a reasonable chance of noting the patents in our lists, any patent published after February 1977 was discarded from our lists. Duplicates were found between the two searches. These, too, were excluded from the sample. So, too, were any specifications which in our opinion had little relevance to microbiology. After discarding all these items, we were left with 107 patents. We noted patentees and inventors. Inventors were most easily identified by identifying a U.S., West German, Swiss, French, or East German equivalent, as the patent laws of these countries is such that the inventor must be named on the specification. In other cases, we used the INID codes for the identification of data on the front page of patent documents to identify inventors; alternatively, we used other Derwent sources such as *Japanese Patents Gazette* to obtain inventors' names. The patents were all published between 1965 and 1977; so we then carried out author searches (and/or patent number/concordance searches in the case of CA) from 1965 to date. Both inventors and patentees were searched for.

Not every patent in the world represents a unique invention. When someone applies for a patent, he or she often applies for that patent in more than one country. Because of variations in patent law throughout the world, the resulting patent specifications appear in different languages and at different times all over the world. Furthermore, the contents of these patent specifications may not be totally identical because of the varying stringency of patent examination, meaning that

patent examiners may insist on major alterations, minor alterations, or no alterations at all to the specification as it was originally submitted.

The resulting collection of patents, all relating to the same topic but varying subtly in content and appearing at differing times, is known as the family of patents. The first such patent to appear anywhere in the world is usually called the *basic*. All subsequent ones are called *equivalents*. When the Derwent search was carried out for us, all the members of the family recorded by Derwent were noted. In our subsequent searches through the abstracting services, we were not just looking for the basic, but for any member of the patent family. If the abstracting service picked up one or more of the family, it was regarded as having scored a "hit".

We found that 61 out of the 107 patent families were abstracted by at least one of the three abstracting services. Very few were abstracted by all three. There was some variation by subject. In food microbiology, 64% of the families were covered by CA, 31% by MA, and 18% by FSTA. In constrast, in genetic engineering, 58% of the families were covered by CA, 35% by MA, and none by FSTA. Over applied microbiology as a whole, i.e., all 107 families, 47% of the families were noted by CA, 27% by MA, and 7% by FSTA. These figures are not terribly satisfactory. In the case of CA, the percent coverage figures are substantially lower than figures obtained in previous studies,[1,4,18-20] but these other investigations were largely confined to clearly chemical topics. The figure of 47% can perhaps more truly be compared to the coverage by CA of a subject peripheral to chemistry. CA's coverage of animal feedstuff patents has been found to be 57%.[21] In fact, these figures show that CA is a very good source of information on patents outside of chemistry. The fact that CA performed better than MA, an abstracting service whose "core subject" is microbiology, is noteworthy. In some subject areas, e.g., medical applications of microbiology, MA performed as well as CA. In other areas, such as food microbiology and microbial genetics, MA performed far worse. One can only speculate on the reasons for these differences. Only 7 of the 39 patent families concerning food microbiology were noted by FSTA. Both CA and MA covered more families. Again, one can only speculate on the reasons for this unexpected finding.

TIMELINESS OF THE ABSTRACTING SERVICES

We compared the date when a sample patent was issued with the date when it was noted by each of the three abstracting services under study and WPI. Of course, in any one family it was not always the same patent that was being studied. A West German patent may have been abstracted by CA, but the Belgian member of the family might have been the one noted by WPI, and the French member the one abstracted by MA, say. We therefore encountered a problem of inadequate sample size. It is therefore only possible to make realistic comparisons for relatively few countries. The results shown below summarizes our data on these selected countries. An entry is shown in Table I only if the abstracting service covered at least four patents from the named country.

It should be noted that the mean figures in Table I are taken from all the patents covered and not just from those countries for which the retrospective services covered more than four patents. These currency figures are in line with the results from other studies.[1,2,20,22] They confirm that WPI is faster than CA at citing all but Russian patents. MA and FSTA are both very slow at abstracting patents.

PATTERN OF FILING EQUIVALENTS

We studied the 107 patent families in a little more detail. Using the CA and WPI databases, we identified all the known members of each of the 107 families of patents. It is possible that between them the two services will fail to note a particular equivalent. On the basis of the work of Johns et al.,[17] we are fairly confident that the number of such omissions will be low. Forty seven of the patent families had only one member. These results are remarkably similar to those obtained by Oppenheim and Sutherland for metallurgical patents.[1] It would be interesting to find out if about 50% of all patent families have only one family member, irrespective of subject matter. The mean family size of those microbiological patents that did have at least one equivalent was 7.2. The comparable figure for metallurgical patents is 6.[1]

Table I. Mean Time Delay (in days) between Publication Date of Patent Specification and That in the Secondary Service

country under study	WPI	CA	MA	FSTA
Belgium	61			
Canada	51			
Czechoslovakia	133			
Denmark	65			
France	119	253		
E. Germany	155			
W. Germany	43	112		
Hungary	52			
Israel	64			
Italy	129			
Japan	70	134		
Netherlands	51			
Norway	61			
South Africa	85			
Sweden	54			
Switzerland	69			
Great Britain	35		352	214
U.S.A.	44	98	405	
U.S.S.R.	241	130		
mean	72	155	384	404

We then carried out a study on the minimum number of countries an abstracting serivce would have to cover in order to pick up at least 90% of our set of 107 patent families. The methodology we employed was that of Oppenheim and Sutherland,[1] and will not be repeated in detail in this paper.

We found that 14 of the 107 (13.1%) patent families consisted of a single U.S. patent with no other family members. It is clear, therefore, that in order to achieve 90% coverage, the U.S. is one country that must be covered. Similarly, we found that 12.2% of the families consisted of a single Soviet patent without any other family members. Furthermore, 11.2% of the families consist of a single Japanese patent. Therefore, it is clear that to achieve at least 90% coverage of the families, U.S., Soviet, and Japanese patents must be covered. Watching these three countries alone would pick up 87.9% of the patent families. The addition of a fourth country brings the coverage to over 90%. We found that this fourth country could either be Great Britain (92.5% total), France (93.5%), or West Germany (93.5% again). However, it could be argued that if a company had only filed a specification in just one country, the invention was not likely to be greatly significant. In our earlier paper, we arbitrarily assumed that an abstracting service would only be interested in covering patents that were the subject of at least two patents in different countries.[1] On this basis, it was found that to achieve 90% coverage of these patent families in the field of metallurgy, one would have to cover British, U.S., and either French or West German patents.

In our study, there were 60 patent families which were the subject of at least 2 patent specifications in different countries. In order to achieve at least 90% coverage of these families, an abstracting service has, we found, a wide variety of choices. Assuming that the service is in the English language and it finds French and German easier to handle than other foreign

languages, then the abstracting service has the following choices: Britain + France (55), Britain + West Germany (56), Britain + Belgium (54), Britain + Canada (56), Britain + Switzerland (54), U.S. + France (58), U.S. + West Germany (55), or Britain + U.S. (58). The numbers in parentheses denote the number of patent families out of 60 picked up by the various combinations noted. The preferred choices for an English-language service would clearly be Great Britain + U.S.

This result is remarkably close to that achieved by Oppenheim and Sutherland for metallurgical patents.[1] Again, it makes one wonder whether coverage of British and U.S. patents for most subject areas would give close to 90% coverage of all families containing two or more members.

However, it is important to state a caveat at this point. The assumption that a patent is important only if it is filed in more than one country is a highly arbitrary one. There may have been very good reasons why the Russian and Japanese patents we had noted were the only members of their various families. Indeed, it is common knowledge among the patent searching profession that frequently Russian and Japanese inventors file applications in their home country and nowhere else. In the case of the USSR, this is a reflection of their patent system, which is more akin (for Russian nationals) to a "suggestion box" reward system than to a true patent system. So Russian specifications filed by nationals tend to be brief and do not include sufficient detail to be accepted by foreign patent offices. It is not so easy to find an explanation for the trend to applications in Japan alone, although translation difficulties may deter Japanese nationals from filing abroad. Other research from this Centre[23] has shown both the dominance of Japanese companies in the patenting of microbiological syntheses of cephalosporins and a tendency for single Japanese applications without equivalents elsewhere.

We therefore recommend that an abstracting service cover U.K., US., Japanese, and Soviet patents. This combination guarantees greater than 90% coverage of microbiological patents and also ensures timely information about these patents, as both Great Britain and Japan are "early publishing" countries which have adopted the deferred examination system of patent law.

CONCLUSIONS

Searchers should regard microbiological patents as a major source of important information. The microbiological patent literature is significant in size and is likely to increase substantially in the future with changes in patent laws throughout the world. At the moment, none of the major abstracting and indexing services in the field of microbiology cover patents in a satisfactory manner. Either they do not cover them at all or they only cover a proportion of the microbiological patent literature. In the case of CA and MA, this is because of the nature of the subject-based selection. Our research has demonstrated that the microbiological patent literature shows a clear pattern of filings which can be exploited by secondary services. For achievement of both timely coverage and comprehensive coverage, a service should scan all Japanese, Soviet, British, and U.S. patents. If cost problems make this unrealistic, the service should simply cover U.S. and British patents only. In this way, they will cover more than 90% of the patent families containing two or more members.

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