Library Support of Signature Areas of Research
at the University of Saskatchewan:
Food and Bioproducts for Sustainable Future

The information about the signature area "Food and Bioproducts for Sustainable Future" available publicly at this point is limited to the Draft of Signature Areas of Research at the University of Saskatchewan. This assessment therefore had to be conducted on the basis of a general understanding of the scope of the signature area, preliminary knowledge about the involvement of different groups of researchers and the knowledge of the use of information sources by faculty already working in this area at the College of Agriculture and Bioresources. The assessment includes an overview of the major resources known to be part of any collection supporting the discipline broadly. More information about the development of this signature area at the U of S will allow to conduct a more focused analysis and if necessary – to develop broader library support.

1. Introduction

Several detailed evaluations of collections and services supporting academic programs offered by the College of Agriculture and Bioresources were conducted in course of the last 12 years. Two major evaluation were completed in conjunction with the Systematic Program Review in 1999 and with the Review of Graduate Programs in the Agricultural Sciences in the Fall of 2010.According to the results of all earlier evaluations the collection of materials in the field of food and bioproduct science, as well as in all related areas adequately supports the research needs of information users of any level.

Library support of research is focused on three broad areas: providing access to information resources through locally developed collections and a document delivery service, user education and reference.

2. Collections

The collection of library materials in the area of food and bioproduct science contains a very significant component of literature collected to meet the advanced needs of researchers in the field. To insure the adequacy of the collection to specific research needs faculty members are asked to recommend materials for acquisition. Collections include materials in all formats, although the emphasis is always made on acquisition of materials in the electronic format. A significant factor in the development of collections of electronic materials during the last decade were consortia purchases through university library consortia. The major ones were the National Site Licensing Project and the Canadian Research Knowledge Network. The collection of periodical literature is predominantly electronic. The collection of monographs is mostly printed, although the component of electronic books is rapidly growing. Collections are systematically evaluated and the print collection is subject to weeding to ensure its functionality and easy accessibility.

It is important to mention that access to resources in all formats is supported by the state of the art computer environment. The Library uses one of the most advanced Integrated Library System (INNOPAC), linking software (SFX) that enables access to full-text documents through the records in the library catalogue and journal articles databases, a recently acquired Discovery Lawyer type of software that allows searching across various databases, and software needed for the management of bibliographic records (RefWorks). Access to a full range of resources and software is available locally though the Learning Commons machines at any library facility, and remotely through an authentication system. The use of technology is supported by the Information Technology Help Desk located in the Main Library and available over the phone and web.

2.1. Reference Tools:

A broad range of reference tools such as handbooks, dictionaries, encyclopedias and indexing and abstracting services is available at the U of S Library. Most of these resources are acquired in the electronic format as part of larger collections through library consortia together with other university libraries in Canada.

In spite of the availability of free Internet search engines such as Google Scholar, Scirus and others indexes to literature remain major information retrieval tools. The availability of the following indexes to journal articles (journal article databases) is of primary importance to a research collection in

the food science.

FSTA Direct (Food Science and Technology Abstracts): The only journal article database specialized in the field of food science, food technology and food-related human nutrition literature. Indexes over 4600 serial publications published in up to 40 languages. Goes back to 1969.

CAB Abstracts: Covers literature in all areas of the agricultural sciences, including food science. Includes entries from journals, books, conference proceedings, reports, and patents. Includes literature from over 140 countries in more than 40 languages. starting with 1910.

Agricola: A bibliographic database of resources in the U.S. National Agricultural Library (NAL) and cooperating institutions. Covers literature in all areas of agriculture including food science. Includes records of journal articles, monographs, theses, patents, software, audio-visual materials, and technical reports. Available since 1970, AGRICOLA serves as a document locator and bibliographic access and control system for the National Agricultural Library (NAL) collection, but since 1984 the database has also included some records produced by cooperating institutions for documents not held by NAL.

SciFinder Scholar: A major information retrieval tool for all areas of chemistry including food chemistry. Includes Chemical Abstracts (literature in chemistry, and numerous patents), CASRegistry (Substances database), CASReact (Organic chemical reactions) and CHEMCATS (Commercial chemical information).

BIOSIS Previews
The most comprehensive abstract database indexing literature in all areas of biology, biochemistry and biotechnology. Goes back to 1926.

BIOSIS Citation Index
This new databases is an enhanced version of BIOSIS Previews. It contains exactly the same content and indexing features as BIOSIS Previews and additionally – includes citation linking. Until the beginning of next year the U of S will provide access to both databases. In 2011 the subscription to BIOSIS Previews will be canceled.

Microbiology Collection: The only journal indexing and abstracting service specialized in microbiology. Includes tree sections: Algology, Mycology and Protozoology Abstracts. Goes back to 1982.

Medline: The major information retrieval tool in all areas of the medical sciences, including veterinary medicine and nutrition.

GeoRefand GeoRef in Process: Index and abstract database covering geoscience journal articles, books, maps, conference papers, reports and theses. Include a pre-publication database. Coverage: 1693 - present for North America and 1933 - present for world literature.

GeoBase A bibliographic abstract and indexing database covering all areas of geography, ecology, geology and geomechanics. It indexes 2,000 journals from 1973 onwards

Web of Science
A major multidisciplinary indexing service that includes records of articles from the most reputable scholarly journals in all subject areas. Contains citation linking going back to the late 1940s.

Scopus
The largest multidisciplinary database that covers all subject areas and includes materials in all formats including academic websites. Contains citation linking. Coverage starts approximately with 1996. Retrospective indexing is not planned.

A full list of bibliographic tools relevant to the field of food and bioproduct science can be found on the library web pages for Food and Bioproduct Science, Plant Science, Animal Science, as well as other related subject pages at http://library.usask.ca/. A comparison of the list of reference tools available at the U of S with the lists of reference tools available at other universities in North America shows an exceptional strength of the U of S Library in supporting information retrieval at any level of needs in the field of soil science.

2.2. Books

Most of the monographs important to the area of food and bioproduct science are acquired with the library fund allocated for purchases in the agricultural sciences. Additional acquisitions are made with the biology, nutrition, chemistry and chemical engineering subject funds, as well as with the science discretionary fund. The science discretionary fund is usually used as a source of funding for interdisciplinary or most expensive publications. Funding available for the acquisition of monographs in the agricultural sciences and related areas are shown in Table 1:

Table 1. Funding for monograph acquisition in areas related to food and bioproducts

	2010-2011	2009-2010	2008-2009	2007-2008	2006-2007
Agriculture	$24,858	$19,887	$27,000	$27,000	$29,624
Biology	$27,127	$25,472	$32,807	$32,807	$32,807
Chemistry	$28,883	$23,106	$28,883	$29,960	$29,960
Chemical Engineering	$12,210	$9,768	$12,210	$12,210	$12,210
Environmental Sciences	$10,088	$7,271	$10,088	$9,088	$9,088
Geography	15,019	12,015	17,019	15,019	15,019
Nutrition	$4,198	$4,784	$5,980	$6,269	$6,269
Veterinary Medicine	$46,456	$37,165	$46,456	$46,456	$46,456

In the course of the last several years a significant number of electronic versions of monographs in all disciplines including agriculture were acquired as part of large electronic book collections with funds other than the agriculture monographs fund. This is a major new tendency in the acquisition of books that has a significant impact on the collections of materials in all disciplines and is of particular value for interdisciplinary areas such as food and bioproduct science. Some of the electronic book collections are published by one major publisher such as Springer, Oxford University Press, Cambridge University Press, Duke University Press and others. Others are acquired through vendors that aggregate publications of individual publishers and make them available on their platform. The largest ones are NetLibrary, Ebrary and MyILibrary. Electronic books are very functional because of the 24x7 access to their full text from

any location and added reading functions such as making notes on the margins, printing and saving limited parts of the text. Any book regardless to the format can be found in the U of S Library Catalogue.

Most of the printed materials in food science are housed in the Natural Sciences Library, some may be found in the Health Sciences or Engineering Libraries. Access to the full-text of any electronic book is available remotely through an authentication system.

Access to information about books published worldwide is available through the electronic version of Global Books in Print. Obviously, most of the publications included into the Global Books in Print are not available at the U of S Library. However publications that are considered important by faculty can be either recommended for acquisition, or requested as an interlibrary loan at no charge.

The collection of books owned by the University of Saskatchewan combined with interlibrary loan service adequately supports the needs of researchers in the field on food and bioproduct science. Information needs of researchers will be closely monitored in the course of the coming years and a request for more funding and additional acquisitions of library materials will be made if necessary.

2. 3 Periodicals

Periodicals are recognized as the most important component of research library collections in the science areas. An earlier collection evaluations conducted in conjunction with the Review of Graduate Programs in the Fall of 2010 has proven the exceptional strength of the U of S collection of journals in the food and bioproduct science, as well as in all related areas.

The development of the collection of periodical literature at the U of S reflects the significant changes in the production and commercial distribution of serials that occurred in the course of the last decade. In spite of numerous concerns expressed in the course of these changes by scientists and librarians, they resulted in a significant growth of the number of journals available at research university libraries. Three aspects of these changes that were most important to libraries, included the complete transition to the electronic format, an entirely new subscription model that replaced access to individual journals with subscriptions to entire journal collections of various size and content, and the open access movement that led to the creation of journals freely available on the Internet.

The most important outcome of the rapid proliferation of electronic publishing for libraries was the need to provide adequate technological support for online journals and to eliminate the duplication of the print and electronic format in the subscription to the same titles. The policy of most of the university libraries, including the University of Saskatchewan was to cancel the print versions of journals available electronically. Exceptions are made for some of the highly ranked titles.

The replacement of individual journal subscriptions by licensing of entire journal collections occurs in two forms. Most of the collections are licensed directly from publishers who create online collections of their own publications and offer them to libraries as a package. The major acquisitions of this type that were made in the last several years include Science Direct (Elsevier), Springer Link Journals, Wiley Online Library, Oxford University Press Journals, Annual Reviews and others. Another venue for journal acquisition is offered by vendors who aggregate journals published by various publishers into packages and enable access to these collections through their platform. Examples of a major aggregator hosting e-journals coming out of various sources are HighWire Press and JSTOR. Most of these large journal collections were acquired by the University of Saskatchewan Library through library consortia together with other university libraries in Canada.

One of the most widely used approaches to the assessment of the collection of periodicals supporting research is based on the local availability of the most highly ranked journals listed by the Journal Citation Reports. A comparison of the top 20 journal titles listed

by JCR under the category “Food Sciences and Technology” with local holdings showed that all of the listed journals were currently available at the U of S Library.

Table 2: Availability of Journals Listed in JCR under the category “Food Science and Technology” at the U of S Library Collection

Abbreviated Journal Title	ISSN	Impact factor
1. MOL NUTR FOOD RES	1613-4125	4.356
2. TRENDS FOOD SCI TECH	0924-2244	4.051
3. CRIT REV FOOD SCI	1040-8398	3.725
4. FOOD MICROBIOL	0740-0020	3.216
5. FOOD HYDROCOLLOID	0268-005X	3.196
6. FOOD CHEM	0308-8146	3.146
7. CHEM SENSES	0379-864X	3.031
8. INT J FOOD MICROBIOL	0168-1605	3.011
9. J CEREAL SCI	0733-5210	2.49
10. J AGR FOOD CHEM	0021-8561	2.469
11. FOOD CONTROL	0956-7135	2.463
11. J DAIRY SCI	0022-0302	2.463
13. J FOOD COMPOS ANAL	0889-1575	2.423
14. FOOD RES INT	0963-9969	2.414
15. INT DAIRY J	0958-6946	2.409
16. BIOTECHNOL PROGR	8756-7938	2.398
17. J FOOD ENG	0260-8774	2.313
18. POSTHARVEST BIOL TEC	0925-5214	2.311
19. FOOD BIOPROCESS TECH	1935-5130	2.238
20. INNOV FOOD SCI EMERG	1466-8564	2.174

A similar analysis conducted for several related areas – Applied Microbiology and Biotechnology, Plant Science, Animal and Dairy Science, Soil Science and Agricultural Economics showed a 100% availability of all of the top ranked journals (Appendix 1-5)
The collection of journals at the U of S undoubtedly meets the needs of food scientists of any level.

2.4 Theses and Dissertations

The U of S provides access to the all of the major Dissertation Databases. They include:
ProQuest Dissertations & Theses : Index and full text database of doctoral dissertations and selected masters theses from North American and European Universities with full-text available from 1997.
Index to Theses A comprehensive listing of theses with abstracts accepted for higher degrees by universities in Great Britain and Ireland since 1716
Theses Canada Portal A comprehensive database of Canadian theses and dissertations compiled by the Library and Archives Canada and other partner University libraries.
University of Saskatchewan Electronic Theses & Dissertations 1914 - present
A complete collection of University of Saskatchewan theses beginning with 2007 and a selection of theses from 1914 - 2007. The full text is available in PDF format.

2.5 Data and GIS

Data sources are comprised primarily of Statistics Canada public user data files available under the Data Liberation Initiative (DLI) program, and files from the Inter-University Consortium for Political and Social Research (ICPSR). Financial datasets including CRSP, COMPUSTAT, FP and TSE/Western have also been acquired. Other data files include FAO and OECD data sets, and DMTI geospatial data. Government produced data files are catalogued and listed in the catalogue. Licensed software includes ArcGIS (complete suite), Geopinpoint and GeoSuite.

3. **Services**

User education is one of the services traditionally provided by the U of S Librarians to various groups of patrons including new faculty, researchers with other status and research assistants. Training is offered a form of individual sessions, presentations at seminars, or specially organized classroom training sessions. Online training sessions can be provided with the help of online conferencing software upon request to users unable to attend a session offered on site.

Online guidance supporting independent use of information resources is provided through subject pages and LibGuides. Subject pages with lists of different types of resources pertinent to the discipline were developed for the Department of Food and Bioproduct Science, as well as for all other departments at the College of Agriculture and Bioresources. LibGuides ia a recently developed type of software designed specially to provide educational library support to its users. A LibGuide supporting the signature area of food and bioproducts was recently developed by the librarian. It will be constantly updated with new resources and if necessary – redesigned to accommodate the needs of its users.

Reference assistance is provided by the U of S Library through desk reference available in every branch location and via virtual online "Ask Us" service. Specialized reference is offered by respective subject librarians. Data and GIS Services at the University Library provide research support and training in the area of data retrieval and management.

InterLibrary Service enables library clients to request materials not owned by the U of S Library at no charge. The service depends on borrowing and lending agreements between the U of S Library and other libraries. Most of the items unavailable locally can be obtained at no charge for the U of S faculty.

Yelena Pancheshnikov, Ph.D
Liaison Librarian for the College of Agriculture and Bioresources
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Appendix 1: Availability of Journals Listed in JCR under the category "Biotechnology and Applied Microbiology" at the U of S Library Collection

Appendix 1: Journal titles in Applied Microbiology and Biotechnology available at the U of S

Rank	Abbreviated Journal Title	ISSN	Impact Factor
1	NAT BIOTECHNOL	1087-0156	29.495
2	NAT REV DRUG DISCOV	1474-1776	29.059
3	GENOME RES	1088-9051	11.342
4	BIOTECHNOL ADV	0734-9750	8.25
5	CURR OPIN BIOTECH	0958-1669	7.82
6	STEM CELLS	1066-5099	7.747
7	BRIEF BIOINFORM	1467-5463	7.329
8	MUTAT RES-REV MUTAT	1383-5742	7.097
9	TRENDS BIOTECHNOL	0167-7799	6.909
10	GENOME BIOL	1474-760X	6.626
11	MOL THER	1525-0016	6.239
12	NANOMEDICINE-UK	1743-5889	5.982
13	BIOSENS BIOELECTRON	0956-5663	5.429
14	BIOINFORMATICS	1367-4803	4.926
15	BIOFUEL BIOPROD BIOR	1932-104X	4.885
16	GENE THER	0969-7128	4.745
17	PLANT BIOTECHNOL J	1467-7644	4.732
18	METAB ENG	1096-7176	4.725
19	BIOFOULING	0892-7014	4.415
20	MOL PLANT MICROBE INT	0894-0282	4.407

Appendix 2: Availability of Journals in Plant Science Listed in JCR at the U of S Library Collection

Abbreviated Journal Title	ISSN	Impact factor
ANNU REV PLANT BIOL	1543-5008	23.46
ANNU REV PHYTOPATHOL	0066-4286	11.212
CURR OPIN PLANT BIOL	1369-5266	10.333
TRENDS PLANT SCI	1360-1385	9.883
PLANT CELL	1040-4651	9.293
PLANT J	0960-7412	6.946
PLANT PHYSIOL	0032-0889	6.235
NEW PHYTOL	0028-646X	6.033
PLANT CELL ENVIRON	0140-7791	5.081
CRIT REV PLANT SCI	0735-2689	4.769
PLANT BIOTECHNOL J	1467-7644	4.732
J ECOL	0022-0477	4.69
MOL PLANT MICROBE IN	0894-0282	4.407
J EXP BOT	0022-0957	4.271
PLANT MOL BIOL	0167-4412	3.978
BMC PLANT BIOL	1471-2229	3.774
PLANT CELL PHYSIOL	0032-0781	3.594
ANN BOT-LONDON	0305-7364	3.501
MOL PLANT PATHOL	1464-6722	3.455
PLANTA	0032-0935	3.372

Appendix 3: Availability of Journals Listed in JCR under the category "Agriculture, Dairy and Animal Science" at the U of S Library Collection

	Abbreviated Journal Title	ISSN	Impact factor
1	J ANIM SCI	0021-8812	2.466
2	J DAIRY SCI	0022-0302	2.463
3	ANIM GENET	0268-9146	2.292
4	ANIM FEED SCI TECH	0377-8401	1.866
5	APPL ANIM BEHAV SCI	0168-1591	1.831
6	J ANIM BREED GENET	0931-2668	1.706
7	J REPROD DEVELOP	0916-8818	1.697
8	POULTRY SCI	0032-5791	1.673
9	DOMEST ANIM ENDOCRIN	0739-7240	1.651
10	WORLD POULTRY SCI J	0043-9339	1.613
11	REPROD DOMEST ANIM	0936-6768	1.606
12	ANIM REPROD SCI	0378-4320	1.563
13	ANIMAL	1751-7311	1.461
14	SMALL RUMINANT RES	0921-4488	1.428
15	LIVEST SCI	1871-1413	1.41
16	GENET SEL EVOL	0999-193X	1.402
17	J DAIRY RES	0022-0299	1.343
18	J ANIM PHYSIOL AN N	0931-2439	1.229
19	BRIT POULTRY SCI	0007-1668	1.064
20	CZECH J ANIM SCI	1212-1819	1.008

Appendix 4: Availability of Journals in Soil Science Listed in JCR at the U of S Library Collection

	Abbreviated Journal Title	ISSN	Impact factor
1	SOIL BIOL BIOCHEM	0038-0717	2.978
2	SOIL TILL RES	0167-1987	2.883
3	J SOIL SEDIMENT	1439-0108	2.613
4	PLANT SOIL	0032-079X	2.517
5	GEODERMA	0016-7061	2.461
6	PEDOBIOLOGIA	0031-4056	2.414
7	SOIL SCI SOC AM J	0361-5995	2.179
8	EUR J SOIL SCI	1351-0754	2.131
9	APPL SOIL ECOL	0929-1393	2.122
10	SOIL USE MANAGE	0266-0032	2.027
11	VADOSE ZONE J	1539-1663	1.991
12	CATENA	0341-8162	1.933
13	BIOL FERT SOILS	0178-2762	1.757
14	J PLANT NUTR SOIL SC	1436-8730	1.595
15	CLAY CLAY MINER	0009-8604	1.431
16	NUTR CYCL AGROECOS	1385-1314	1.35
17	LAND DEGRAD DEV	1085-3278	1.326
18	EUR J SOIL BIOL	1164-5563	1.247
19	PEDOSPHERE	1002-0160	1.103
20	J SOIL WATER CONSERV	0022-4561	1.033

Appendix 5: Availability of Journals in Agricultural Economics and Policy Listed in JCR at the U of S Library Collection

Abbreviated Journal Title	ISSN	Impact factor
FOOD POLICY	0306-9192	1.606
J AGR ECON	0021-857X	1.155
AUST J AGR RESOUR EC	1364-985X	1.055
AM J AGR ECON	0002-9092	1.047
EUR REV AGRIC ECON	0165-1587	0.86
AGR ECON-CZECH	0139-570X	0.716
AGR ECON-BLACKWELL	0169-5150	0.673
CAN J AGR ECON	0008-3976	0.552
REV AGR ECON	1058-7195	0.523
J AGR RESOUR ECON	1068-5502	0.474
ITEA-INF TEC ECON AG	1699-6887	0.066