Food science and technology information resources

Part 1: Searching and sources
The answers to such questions might help you to understand the general need to understand what you are searching and how to search it. That said, different search interfaces and databases require different search strategies, marketing information, and news providers.

Key resources in your subject area.

TicTocs is a free service, initially funded by JISC and project partners, where membership rates, and many journals offer student discounts. A great number of abstracts are usually listed in your library's catalogue – a database of the books, protocols, eReferences, and book series published by Springer.

Your library or information centre will probably have a good collection of academic journals. Subscriptions, free or otherwise, to academic journals are frequently held by United States Department of Agriculture's National Agricultural Library, Food Safety Authority of Ireland (FSAI) (working to ensure that food, animals and plants to ensure the health and well-being of the world economy), French Agengy for Food, Environmental and Occupational Health & Safety (conducts research in a wide range of fields including human health), Canadian Food Inspection Agency (CFIA) (dedicated to safeguarding food, animals and plants to ensure the health and well-being of the Canadian population), and many others.

Researchers and students can search the scientific literature and can create RSS feeds to receive alerts on newly published material. They can also export them as an Outline Processor Markup Language (OPML) file to use with other software. However, for a deeper understanding of your topic, it is necessary to understand the type of material you are searching for. For example, conference proceedings can generally provide peer reviewed research and background information, journal articles provide the most accessible agricultural information collections, and textbooks provide an introduction to the topic. The Grey House Publishing Food and Beverage Market Place (company profiles including academic journals), Food Processing Technology (industry projects, suppliers, events and statistics), Productscan (new product information), International Diary Federation (IDF) standards, United States Department of Agriculture's National Agricultural Library, and Food Science Resource (a food science resource) are among the many resources available.

Developing an understanding of what you are looking for is crucial to finding relevant information. Knowing what to look for and how to search for it is the key. This includes understanding the types of material available and what they are best suited for. For example, textbooks provide an introduction to the topic, journal articles provide in-depth research, and conference proceedings provide recent developments.

When searching for information, it is important to consider the source of the information. Is it reliable? Is the information fact-based or opinion-based? Is the information balanced – are all points of view given? If not, do they have a reason for excluding certain viewpoints? Is the information up-to-date? Is the information from a reputable source? Is the information from a source that is known for providing accurate information?

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Introduction

As a student you’re probably aware of the qualitative distinction between published research and general internet sites. Though how sophisticated is your understanding of things like peer review or prevalence? There is a common misconception that if something is published it must be reliable – what do you think?

There’s a growing diversity in the kinds of content identified as ‘research’ but journal articles and books still dominate students’ perceptions of what constitutes research. This article is a practical guide to the various food science and technology information resources available to you.
What information is available?

Most scientists, researchers and students only have time to read a few key journals, papers and websites, yet the vast range of published information available means that keeping up to date with everything is a daunting task.

The key is to carefully select your sources in order to optimise the quality and quantity of the information you retrieve.

Your library will normally subscribe to and purchase resources relevant to the courses your institution offers, so this will be your best starting point. These are usually listed in your library’s catalogue – a database of the books, journals, and other materials that the library can provide access to in print or online.

How to search

There is no right or wrong way to search for information. However before you start searching you need to identify the type of information you are looking for and then choose the most relevant source, for example, books, encyclopedias and reviews are good for background information, journal articles generally provide peer reviewed research papers, whereas conference proceedings can offer novel and subject specific research information.

It’s a good idea to start by looking in an abstract & index (A&I) database, or bibliographic database as they are otherwise referred to. This will show you what kind of research has been done in your area of interest. It might be tempting to use Google or similar and enter a search term. Yet, this will almost certainly return more results than you need. Many of these results could lead to unreliable or unsuitable resources and you may have to spend even more time looking for the right information.
Thinking about the best place to start your search could save you time in the long run. For example:

- What kind of information do you need? Scientific data, up-to-date research or other material such as marketing information, company statements, current opinions, laws and regulations, or policy information?
- What types of publications do you need? Scientific peer reviewed journals, professional journals, theses, conference proceedings, technical reports, recent newspaper articles, policy documents?
- Does your topic come from a specific area of research or is it more general?
- Are dates important - do you want recent research, a specific date or all the research in a given time period?
- Which countries, geographic regions or climate zones are you interested in?
- What language do you want the information to be presented in?

Is it reliable?

Key things to look for when searching for information:

- Who is responsible for the data - are they an authoritative body, a reliable organisation, an academic publisher, a subject expert? Have you heard of them, do you know them?
- Is the information and research sponsored by anyone – investigate thoroughly as it may not be obvious. Is it sponsored by a company or a political organisation? Are they likely to have their own agenda?
- Is the information balanced - are all points of view given? If not, do they have a caveat that it is just their opinion? Is the information fact or opinion and is it obvious?
- Is it accurate – are the spelling and grammar correct?
- Timeliness - is the information up to date and when was it last updated?
In addition there are factual databases which contain figures such as melting information. Different search interfaces and databases require different search strategies, marketing information, and news providers. For example, from publishers, A&I databases, patents, standards, business and economic information, and news providers. In addition to individual databases, your library may provide access to an electronic collection of electronic reference works available online or in print. They are particularly useful if you want to get a brief overview of a subject area or to look up something specific. Encyclopedias, for instance, are particularly useful for their access to reliable information, selected by experts from a wide range of sources. They are:

- A collection of articles written by experts and usually peer reviewed - a process of self-regulation by a profession or a process of evaluation involving qualified individuals within the relevant field.
- Published online and/or in print.
- Up to date, containing the most recent research on a topic.
- Usually available on subscription, but some are available free under the 'author pays' model, more commonly known as Open Access.

Peer review methods are employed to maintain standards, improve performance and provide credibility. Therefore, because academic journals often contain peer reviewed articles they are deemed to be reliable sources of information. Members of learned societies may have access to a journal available at membership rates, and many journals offer student discounts. A great number of publishers’ websites and journals also offer a free ‘Table of Contents’ (TOC) alerting service so you can stay up to date with the research published by each one.

ticTOCS is a free service, initially funded by JISC and project partners, where you can keep up to date with scholarly journal TOCs. You can find over 11,000
scholarly journal TOCs from over 350 publishers and you can view the latest TOC for each journal. You can export an individual TOC RSS feed to popular feed readers. You can also link to the full text of hundreds of thousands of journal articles (where institutional or personal subscription, or Open Access, allows). You can export citations to RefWorks, or another online research management, writing and collaboration tool of your choice. You can save selected TOCs to MyTOCs so that the next time you visit you can see new TOCs, or so that you can export them as an Outline Processor Markup Language (OPML) file. You can also register with ticTOCs so that your selected MyTOCs will be permanently saved and accessible from any networked computer.

The following list highlights some of the Web services offered by academic journal publishers:

- **SciVerse ScienceDirect** (an Elsevier information source for scientific, technical, and medical research. Subscription required for some sections)
- **Wiley Online Library** (provides full-text access to Wiley journals, reference works, books and databases)
- **SpringerLink** (an integrated full-text database for journals, books, protocols, eReferences, and book series published by Springer)
- **Taylor & Francis Online** (an online platform for Taylor & Francis Group content)
- **BioMed Central** (online publisher of free peer reviewed scientific articles in all areas of medical research and biology)
- **Ingentaconnect** (collection of academic and professional publications from various publishers)
- **MetaPress** (a division of EBSCO Industries, Inc., provides content management and end-user access websites for e-content from a range of publishers)
- **HighWire Press** (division of the Stanford University Libraries producing online versions of peer reviewed journals and scholarly content on
The answers to such questions might help you to understand the general composition data. Two such databases are:

- **PubMed Central** (U.S. National Institute of Health’s National Library of Medicine repository for peer reviewed primary research reports in the life sciences, also offers access to the A&I database MedLine)
- **J-Stage** (supports the information transmission function of user organisations to computerise and disseminate bulletins of academic societies and research papers - predominantly Japanese)
- **JSTOR** (a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content, including academic journals).

Staying well-informed with the key research in your area and identifying the right journals or articles can be a daunting task. Your library website is a good place to start. Alternatively, look at any of the following science-specific search engines:

- **Refdoc** (scientific article search and order engine, a service provided by Institut de l’Information Scientifique et Technique (INIST) of Centre National de la Recherche Scientifique (CNRS), France)
- **CiteSeer** (scientific literature digital library and search engine)
- **ISI Highly Cited** (a search tool to identify individuals, departments and laboratories that have made fundamental contributions to the advancement of science and technology in recent decades)
- **MyNetResearch.com** (allows researchers worldwide to collaborate, manage projects, stay informed about the latest research developments in their subject specialisations, and use specialist tools to help them with research)
- **Online Journals Search Engine** (a multi-search tool that permits queries on a number of scientific journals)
- **Science Dictionary** (a science-specific search engine which pull data from scientific web sites)
- **Science-advisor.net** (scientific search engine and online forum. Researchers and students can search the scientific literature and can freely and anonymously discuss and review research articles)
- **Sciurus** (search engine that fetches only scientific websites)
• **WorldWideScience** (a search which uses multilateral partnerships to search national and international databases).

Also, try **Chemedia** for food science and technology from Spain and Latin America, and the ever-developing resource **Google Scholar** can also point you in the direction of scholarly material.

### Google Scholar

Google Scholar is the scholarly search tool of the world’s largest and most powerful search engine, Google. It’s an important device allowing researchers to locate a wide array of academic literature on the internet, including scholarly journals, abstracts, peer reviewed articles, theses, dissertations, books, preprints, PowerPoint presentations and technical reports from universities, academic institutions, professional societies, research groups, and preprint repositories around the world.

An important feature of Google Scholar is ‘cited by’ – researchers can use it to trace interconnections among authors citing articles on the same topic and to determine the frequency with which others cite a specific article. Google Scholar automatically extracts and analyses citations and presents them as separate results, even if the documents they refer to are not available on the internet. So it analyses the popularity of a document according to the number of times it has been cited by other documents, and generally displays the retrieved results showing the most-cited references first. These tend to be older documents though as newer items have had less chance to be cited.

Google Scholar is, however, not without its disadvantages. Sometimes, it will include administrative notes, library tours, student handbooks, etc., which are not exactly scholarly material from the point of view of the traditional definition of scholarly information. Sources of publications may not be
universally recognised as scholarly. Unfortunately, Google Scholar’s algorithm cannot distinguish between articles, editorial notes or library guides. There are also some special problems for university scholars, students and researchers. Google Scholar consists of citations and links to journal articles that are not free (not even their abstracts). Librarians’ main concern is that some students and faculty members may pay for articles on Google Scholar that are already available from subscribed databases in university libraries. Also, Google Scholar sometimes links back to databases currently unavailable in university libraries, so faculty members and students may get frustrated using it. Some of these issues may be overcome if the library or publisher provides Google Scholar with details of their current subscriptions; the search tool can then link to these subscribed online versions.

**Google and Soople**

Google makes searching so simple that you might not even know there is a whole page dedicated to searching the platform using more advanced search techniques. You may have seen many sites giving tips on making advanced searches in Google with operators like ‘+’, ‘-’, ‘*’, etc. However, even if you find Advanced Search, it is not the most user-friendly page on the internet.

A new site hopes to change this by making all of Google's advanced searching features more accessible. Soople breaks the advanced features into easy-to-use sections, so variables such as filtering by file type, performing image searches, or searching by numbers are collected on a single page. It has a wide number of advanced options to search Google effectively and easily, with no need to know and remember advanced search operators and tips. In other words, it is like a graphical user interface (GUI) which has many more pre-designed options than a command user interface (CUI). If you want to get more from your Google searches, take a look at Soople’s simple approach to power searching.
Reference works

Your library or information centre will probably have a good collection of reference works available online or in print. They are particularly useful if you want to get a brief overview of a subject area or to look up something specific. Encyclopedias, for instance, are particularly useful for their summaries and lists of references. Other examples are:

- The Grocer Directory of Manufacturers and Suppliers (William Reed Publishing Ltd)
- CRC Handbook of Chemistry and Physics (CRC Press)
- Official Methods of Analysis of AOAC International (AOAC International)
- Dictionary of Food Science and Technology (Wiley-Blackwell Publishing)
- The Composition of Foods (Royal Society of Chemistry)

In addition there are factual databases which contain figures such as melting, boiling and freezing points of various substances, conversion tables and food composition data. Two such databases are:

- United States Department of Agriculture’s National Agricultural Library
- International Food Composition Tables – Directory

Websites

As you would expect, there is a wide and diverse range of food science related information to be found on the Web. The following sites give some idea of the scope:

Industry news

- Just Food (news plus other industry information)
- Productscan (new product information)
- Food Navigator (headlines, products & markets, business tools)
Statistics and market research information

- **Datamonitor** (details of market research reports)
- **Mintel** (research reports, global new products database)
- **Eurostat** (European import & export information)
- **Food and Agriculture Organization** (FAO) (trade and production statistics)

European research programmes

- **British Nutrition Foundation** (EU and UK projects)
- **European Hygienic Engineering and Design Group** (guidance on hygienic engineering)
- **Institute of Food Research (IFR)** (research into harnessing food for health and preventing food-related diseases)

American research programme

- **National Agricultural Library (NAL)** (houses one of the world's largest and most accessible agricultural information collections)

Company information

- **Europages** (food companies in Europe)
- **Food Processing Technology** (industry projects, suppliers, events and newsfeeds)
- **The Grey House Publishing Food and Beverage Market Place** (company information for 40,000 companies in the USA and Canada)
Food safety

- **Canadian Food Inspection Agency (CFIA)** (dedicated to safeguarding food, animals and plants to ensure the health and well-being of Canada’s people, environment and economy)
- **Department for Food and Rural Affairs (DEFRA)** (food standards, labelling and composition in the UK)
- **European Food Safety Authority (EFSA)** (committed to ensuring that Europe’s food is safe)
- **Food Safety Authority of Ireland (FSAI)** (working to ensure that food produced, distributed or marketed in the State meets the highest standards of food safety and hygiene reasonably available)
- **Food Standards Agency (FSA)** (UK food regulations and standards)
- **Food Standards Australia New Zealand (FSANZ)** (develop food standards to cover the food industry in Australia and New Zealand including the regulation of the use of ingredients, colourings and additives)
- **French Agency for Food, Environmental and Occupational Health & Safety** (conducts research in a wide range of fields including human health, animal health and well-being, and plant health)
- **U.S. Food and Drug Administration (FDA)** (U.S. food guidance, compliance and regulatory information)
- **Codex Alimentarius** (protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organisations)
- **Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)** (main aims include promoting a balanced, healthy diet, ensuring that everyday goods are safe and assisting in the development of clear consumer rights)
- **Norwegian Food Safety Authority** (a governmental body whose aim is to ensure that food and drinking water are as safe and healthy as possible for consumers)
International institutions

- **Food and Agriculture Organisation of the United Nations (FAO)** (mandate to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy)

- **International Union of Food Science and Technology (IUFoST)** (a country-membership organisation and a global voice of food science and technology)

- **International Food Information Council Foundation (IFIC)** (dedicated to the mission of effectively communicating science-based information on health, nutrition and food safety for the public good)

Country-specific organisations

- **Institute of Food Technologists (IFT)** (the U.S. membership organisation exists to advance the science of food)

- **National Institute of Health and Nutrition (NIHN)** (objective is to take full responsibility in scientific research in order to meet the Japanese public’s expectations)

- **Ministry of Agriculture, Livestock and Supply (MAPA)** (responsible for managing Brazilian public policy stimulus to agriculture and the development of agribusiness)

- **Institute of Health (ISS)** (leading technical and scientific public body of the Italian National Health Service)

- **Swedish Institute for Food and Biotechnology (SIK)** (develops and mediates technology to promote the development and competitiveness of the food industry)
Abstract & index (A&I) databases

A&I databases are an excellent starting point for any research project. They provide abstracts (summaries) of articles as well as details about the author(s) and original publication (for example, corresponding author’s details, publication date and source) for all the key research published (including that found in books, journals, conference proceedings and other literature) in a certain area.

You can execute a search in an A&I database, rather than using lots of different sources, and find out exactly what research has been carried out, where it can be found and who has written it. Powerful search technology allows students and scientists alike, with little or no information training, to find relevant documents within moments.

Using an A&I database will deliver many benefits including:

- A broad subject coverage of a specific topic
- Access to reliable information, selected by experts from a wide range of sources
- International coverage including some ‘hard to find’ material
- Informative abstracts giving a summary of the research - which might be all you need
- Links to full texts
- Consistent, comprehensive and precise indexing.

Each database is indexed with controlled and sometimes uncontrolled index terms. Controlled terms and classification codes are derived from each database’s subject-specific thesaurus, whereas uncontrolled natural language vocabularies have no restriction on the terms that are used. The value of the index is that it allows you to locate information based on concepts indicated by keywords rather than merely relying on search terms appearing in an item.
Different search interfaces and databases require different search strategies, and offer different options for narrowing or broadening initial answers. You need to understand what you are searching and how to search it. That said, although each database operates in a slightly different way, most allow you to:

- Set up email alerts
- Create RSS feeds
- Save searches
- Email records
- Print records
- Save results in folders
- View results in Citations, Abstract and Detailed formats
- Refine results - faceted search results are presented, structured around key data elements, such as controlled vocabulary, database name, author name, author affiliation, country of author affiliation, document type, year of publication, language, publisher name, or source title. Results can be refined by including or excluding data elements, or combining data elements.

**IFIS** produce their own A&I database:

- **FSTA** - the food science resource

This is often cited as the key database for finding references relevant to food science, food technology and food related nutrition.

A&I databases are usually fee based, although some are free. Access can be provided on different models such as pay per view so it is worth checking with the database provider. Your library will probably subscribe to some or all of the key resources in your subject area.

In addition to individual databases, your library may provide access to an aggregator or vendor platform, sometimes known as a database host, through which you can search a wide range of multiple information sources, for example, from publishers, A&I databases, patents, standards, business and marketing information, and news providers.
Some examples of vendors are:

- **OvidSP**
- **Web of Knowledge**
- **EBSCOhost**
- **ProQuest Dialog**

**Other sources of information**

Other types of information you might want to look at and consider are:

- **Legislation** - it is important to keep abreast of the latest food law and standards information. Government and industry sites are the best place to look for this, but there may also be links from your library website(s).
- **Standards** - approved technical specifications covering certain requirements for quality and testing processes for products and services. The **BSI** and **ISO** websites are useful resources.
- **Patents** - a patent gives the owner sole rights to make, use or sell their invention within a location for a set period of time. Espacenet offers free access to patents.
- **Datasets** - these contain information on food composition, genomics and safety data. Many of these datasets are becoming available free of charge, hosted by governmental and non-governmental organisations, much of it originating in the US.
- **Blogs** - these can be helpful ways to keep up to date with issues in food science. For example, **Thought for Food**
- **Ingredient suppliers and new products and packaging.**
- **Best practices, industry guidelines and standards.** For example, **International Dairy Federation (IDF) standards.**
- **Government information** including **DEFRA, USDA, EFSA.**

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**Check out our website** - [ifis.org](http://ifis.org) - and blog - **Thought for food** - for our second installment *Food science and technology information resources - Part 2: Using A&I databases* which will give an overview of various search tools, techniques and tips, including an introduction to Boolean logic.

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Reference 2000. Individuals with plasma levels that are 25–35% below these recommendations may have a greater risk of developing chronic disease. However, the issue of optimum intake of these components (i.e. how much is enough?) is still not fully understood.

Antioxidant chemistry, but also because of their ability to interact with cell signalling pathways. Initial studies of the effects of diet on disease prevention, occurrence and progression are supported by mechanistic evidence, which has been developed over the years. For example, vitamin E is known to have a capacity to limit the adverse effects of oxidative damage, with the first evidence for its protective effects against heart disease coming from the Women's Health Initiative Study (Gey et al. 2000).

In conclusion, diet and health are closely intertwined, and it is becoming increasingly clear that the prevention of chronic disease is a more important discriminator with regard to the prevention of CVD. Fruits and vegetables, which are rich in antioxidants, are protective against heart disease (Gey et al. 2000).

Long-term human intervention studies aimed at measuring the effect of dietary antioxidants on the levels of oxidative damage that might be considered normal or excessive are needed for the metabolites of dietary antioxidants. Future human dietary intervention studies will have to be conducted to obtain the target site. These studies will be important for the development of biomarkers of oxidative damage and for the use of these biomarkers to assess the effectiveness of diets in preventing chronic disease.

There is compelling epidemiological evidence that links diets containing large amounts of fruits and vegetables to a lower risk of chronic disease. For example, the Nurses’ Health Study (Omenn et al. 1996) found that women with the highest intake of vitamin A had a lower risk of lung cancer than those with the lowest intake. Similarly, the Nurses’ Health Study also found that women with the highest intake of vitamin C had a lower risk of lung cancer than those with the lowest intake.

In summary, diet and health are closely intertwined, and it is becoming increasingly clear that the prevention of chronic disease is a more important discriminator with regard to the prevention of CVD. Fruits and vegetables, which are rich in antioxidants, are protective against heart disease. Future human dietary intervention studies will have to be conducted to obtain the target site. These studies will be important for the development of biomarkers of oxidative damage and for the use of these biomarkers to assess the effectiveness of diets in preventing chronic disease.