Steps for Developing an Effective Research Strategy

1. Create a Timeline for Research.
2. Define Your Information Need.
3. Identify Concepts Related to Research.
4. Consult Subject Specific Experts / Resources.
5. Explore General Reference Resources.
6. Select the Most Appropriate Databases.
7. Utilize Graduate Study Research Techniques.
Part 2: Developing an Effective Research Strategy

- **Step 1: Create a Timeline for Research**
  - Thesis Projects: Begin literature review as soon as you begin lab work.
  - Research Paper: Begin research 2-4 weeks before due date.
    1. It takes 3-6 days to receive articles through MyILL Account.
    2. It takes 1-2 weeks to receive books through MyIIT / I-Share Account.
    3. It can take 2-4 weeks to receive books through MyILL Account.
Part 2: Developing an Effective Research Strategy

■ Step 2: Define Your Information Need

- Your information need is obviously a function of your topic.

1. Topic You Select

   Determine that there is enough information on the topic before you actually select the topic.

2. Assigned Topic

   With an assigned topic, the instructor establishes the research parameters. For example -

   “Write a 5 page paper that describes the chemical processes and issues associated with the browning of fruit. You must use at least 5 scholarly journal articles and cite those articles using APA Format.”
Step 2: Define Your Information Need (Cont.)

Once you have a research topic you define your information need in your own words. For example -

“I need 5 scholarly journal articles that describe the chemical processes and issues associated with the browning of fruit.”
Part 2: Developing an Effective Research Strategy

Step 3: Identify Concepts Related to Your Research

Information Need Defined in Your Own Words:

“I need 5 scholarly journal articles that describe the chemical processes and issues associated with the browning of fruit.”

Key concepts and terms from your Information Need

1) Browning
2) Fruit
3) Chemical Processes
Part 2: Developing an Effective Research Strategy

**Step 4: Consult Subject Specific Experts / Resources**

1. Principle Investigator
2. Professor
3. Subject Librarian
4. Food Science Library Guide at - [http://guides.library.iit.edu/FoodSafety/](http://guides.library.iit.edu/FoodSafety/)
Part 2: Developing an Effective Research Strategy

- **Step 5: Explore General Reference Sources**
  - General reference resources are important because:
    1. They help you generate additional search terms.
    2. They help you write an introduction to your thesis or paper.
    3. They lead you to other resources through the bibliography.
    4. They allow you to see the connection between related ideas.
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Information Sources

General references resources related to Food Science can be found at - http://guides.library.iit.edu/FoodSafety.

Click Reference Resources Tab

List of Reference Resources

- Handbook of Food Science, Technology, and Engineering. TP370.4.H382006
  This four volume set contains a wealth of up-to-date information on food science and technology and should be the starting point for any research topic.
- The Companion Thesaurus to Food Science and Technology Abstracts, Z695.1.F6C651992
  This incredibly important resource should be used to generate additional search terms and synonyms related to your research topic.
- Encyclopedia of Food Microbiology. REF.QR115.E53 2000
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Reference Resources

1. Handbook of Food Science, Technology, and Engineering
   REF TP370.4.H382006

   This four volume set is the best single resource in the library. Always start out with this resource no matter what the topic!

2. The Companion Thesaurus to Food Science and Technology Z695.1.F6C651992

   This useful resource should be used to generate additional search terms and synonyms related to your topic.
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Reference Resources

3. Encyclopedia of Food Microbiology, REF.QR115.E532000

This three volume encyclopedia set is entirely devoted to Food Microbiology and is geared toward academia.

4. The Microbiological Safety and Quality of Food REF.QR115.M4662000

This two volume set relates to food microbiology within a manufacturing context.
Step 5: Explore General Reference Resources

5. *Dictionary of Food Microbiology*, REFQR115.F68130

This resource provides basic definitions for words and concepts connected with food microbiology.

6. *Wiley Encyclopedia of Food Science and Technology*, REF.TP3682E622000

This four volume set can be used to find additional information not available in the Handbook of Food Science.
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Reference Resources


This one volume encyclopedia provides useful background information on topics connected with food packaging.

8. Google

Although websites indexed by Google may not be suitable for use in your paper, Google is a great resource when it comes to background information.
Part 2: Developing an Effective Research Strategy

**Step 5: Explore General Reference Resources**

- Here again is our information need in our own words:
  
  “I need 5 scholarly journal articles that describe the chemical processes and issues associated with the browning of fruit.”

- Here again our the key concepts from that information need.
  
  1) Browning
  2) Fruit
  3) Chemical Processes

- Two of the reference resources have information on your topic:
  
  1) *Wiley Encyclopedia of Food Science and Technology*,
  2) *The Companion Thesaurus to Food Science and Technology*. 
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Information Sources

1. Wiley Encyclopedia of Food Science and Technology

The Wiley Encyclopedia of Food Science has a 6 page article on “Enzymatic Browning” which relates to fruit as opposed to non-enzymatic browning.

This specific chemical reaction is called “polyphenol oxidase” which is also called “PPO.” The article also has 2 pages of references.
Step 5: Explore General Information Sources

2. *The Companion Thesaurus to Food Science and Technology.*

The Companion Thesaurus to Food Science and Technology offers a similar set of synonyms including the phrase, “Browning Reactions”
Part 2: Developing an Effective Research Strategy

Step 5: Explore General Reference Resources

Using these general references resources we have generated four more search terms that relate to “browning” -

Browning Reaction
or
Enzymatic Browning,
or
Polyphenol Oxidase, and Fruit
or
PPO
Part 2: Developing an Effective Research Strategy

Step 6: Select the Most Appropriate Database

Once you have generated all of your search terms click on the “Research Databases” tab - [http://guides.library.iit.edu/FoodSafety/](http://guides.library.iit.edu/FoodSafety/).
Step 6: Select the Most Appropriate Database

Each database on this list has been selected because it indexes journals in the food sciences: The order was based on a series mock searchers using words related to food science.
Step 6: Select the Most Appropriate Database

- **PubMed**
  This publically funded database indexes over 10 million articles connected with the biomedical and life sciences.

- **Wiley InterScience**
  Accesses 4 million articles from leading scientific, technical, and medical journals.

- **Academic Search Premier**
  This multi-disciplinary database indexes over 4 million articles.

- **Biological Sciences**
  Biological Sciences indexes 5 million articles on a wide range of research in biomedicine, biotechnology, agriculture, and veterinary science.

- **SpringerLink**
  Primarily used to gain full-text access to 48,000 books (including book chapters), but also indexes journal articles related to food science as well.

- **Google Scholar**
  Google Scholar DOES NOT index all of the scholarly databases listed above, and for those databases that are indexed, only the title and author are indexed not specific subjects related to each journal article. Therefore, to be efficient, search Google Scholar last - after you have searched all of the other databases listed above.
Part 2: Developing an Effective Research Strategy

**Step #7 Use Graduate Study Research Techniques**

- When searching research databases start out with no more than 2-3 search terms in the *title field*. A common mistake is to use too many search terms!

- Boolean Operators connect your search terms and either narrow or broaden your search results ("And," "Or," "Not").

![Web of Science SM](image)

Boolean Operators
The “AND” Boolean Operator

The *AND* Boolean Operator is used when you want to find articles that contain all of your search terms. The *AND* Boolean Operator always narrows your search results (you get less results).

If you initiate this search you will obtain articles that contain the words “Mineral” and “Deposit” in the title field of the article.
Part 2: Developing an Effective Research Strategy

- The “AND” Boolean Operator (Continued)

  All of the search results contain the words “deposit” and “mineral” in the title the field.

  4. Title: Hydrothermal alteration, fluid inclusions and stable isotope systematics of the Alvo 118 iron oxide-copper-gold deposit, Carajas Mineral Province (Brazil): Implications for ore genesis
     Author(s): Torresi Ignacio; Xavier Roberto Perez; Bortholo Diegi F. A.; et al.
     Times Cited: 0 (from Web of Science)

  5. Title: Natrotitanite, ideally (Na0.5Y0.5)Ti(SiO4)O, a new mineral from the Verkhnee Espe deposit, Akjailayutas mountains, Eastern Kazakhstan district, Kazakhstan: description and crystal structure
     Author(s): Stepanov A. V.; Bekenova G. K.; Levin V. L.; et al.
     Source: MINERALOGICAL MAGAZINE Volume: 76 Issue: 1 Pages: 37-44 DOI: 10.1180/minmag.2012.076.1.37 Published: FEB 2012
     Times Cited: 0 (from Web of Science)

  6. Title: Hanjiangite, a new barium-vanadium phyllosilicate carbonate mineral from the Shiti barium deposit in the Dabashan region, China
     Author(s): Liu Xianjun; Li Guowu; Ma Qian; et al.
     Times Cited: 0 (from Web of Science)

  7. Title: High-temperature conductivity of magnetite ores in relation to their genesis and mineral composition (by the example of the Goroblagodatskoe skarn-magnetite deposit)
     Author(s): Bakhterev V. V.; Kuznetsov A. Zh.
     Times Cited: 0 (from Web of Science)
Part 2: Developing an Effective Research Strategy

The “AND” Boolean Operator (Continued)

IMPORTANT!!! Most databases interpret a space between search terms the same as the Boolean Operator “AND.”

Both of these searches will yield identical results – The words “mineral” and “deposit” will be in the title field.

A space between the search terms is interpreted as an “AND”
Part 2: Developing an Effective Research Strategy

The “AND” Boolean Operator (Continued)

So again we see that all of the search results contain the words “deposit” and “mineral” in the title the field.

1. Title: Hydrothermal alteration, fluid inclusions and stable isotope systematics of the Alvo 118 iron oxide-copper-gold deposit, Carajás Mineral Province (Brazil): Implications for ore genesis
   Author(s): Torresi Ignacio; Xavier Roberto Perez; Bortholoto Diego F. A.; et al.
   Times Cited: 0 (from Web of Science)

2. Title: Natrotitanite, ideally (Na0.5Y0.5)Ti(SiO4)O, a new mineral from the Verkhnee Espe deposit, Akjailyautas mountains, Eastern Kazakhstan district, Kazakhstan: description and crystal structure
   Author(s): Stepanov A. V.; Bekenova G. K.; Levin V. L.; et al.
   Source: MINERALOGICAL MAGAZINE Volume: 76 Issue: 1 Pages: 37-44 DOI: 10.1180/minmag.2012.076.1.37 Published: FEB 2012
   Times Cited: 0 (from Web of Science)

3. Title: Hanjiangite, a new barium-vanadium phyllosilicate carbonate mineral from the Shiti barium deposit in the Dabashan region, China
   Author(s): Liu Jiajun; Li Guowu; Ma Qian; et al.
   Times Cited: 0 (from Web of Science)

4. Title: High-temperature conductivity of magnetite ores in relation to their genesis and mineral composition (by the example of the Goroblagodatskoe skarn-magnetite deposit)
   Author(s): Bakhterev V. V.; Kuznetsov A. Zh.
   Times Cited: 0 (from Web of Science)
Part 2: Developing an Effective Research Strategy

The “OR” Boolean Operator

The OR Boolean Operator is used when you want to find articles that contain either of your search terms. The OR Boolean Operator is used when you want to broaden your search (obtain more records).

If you initiate this search you will obtain articles that contain the words either “Mineral” or “Deposit” in the title field of the article.
Part 2: Developing an Effective Research Strategy

The “OR” Boolean Operator

We see that all of the search results contain either the words “mineral” or “deposit” in the title field.

1. Title: Sorptive removal of ibuprofen from water using selected soil minerals and activated carbon
   Author(s): Behera S. K.; Oh S. Y.; Park H. S.
   Source: INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY Volume: 9 Issue: 1 Pages: 85-94 DOI: 10.1007/s13762-011-0020-8 Published: WIN 2012 Times Cited: 0 (from Web of Science)

2. Title: Control of mineral wool thickness using predictive functional control
   Author(s): Dovzan Dejan; Skrjanc Igor
   Source: ROBOTICS AND COMPUTER-INTEGRATED MANUFACTURING Volume: 28 Issue: 3 Pages: 344-350 DOI: 10.1016/j.rcim.2011.10.004 Published: JUN 2012 Times Cited: 0 (from Web of Science)

3. Title: Improved magnetic properties of SmCo-based films deposited on hot Si substrates
   Author(s): Li Yuanxun; Peng Long

4. Title: Effect of an organic and conventional rearing system on the mineral content of hen eggs
   Author(s): Kucukylirimaz K.; Bozkurt M.; Yamaner C.; et al.
   Source: FOOD CHEMISTRY Volume: 132 Issue: 2 Pages: 989-992 DOI: 10.1016/j.foodchem.2011.11.084 Published: MAY 15 2012 Times Cited: 0 (from Web of Science)

5. Title: Development of electroless silver plating on Para-aramid fibers and growth morphology of silver deposits
   Author(s): Zhang Huirui; Zou Xinguo; Liang Jingjing; et al.
   Source: JOURNAL OF APPLIED POLYMER SCIENCE Volume: 124 Issue: 4 Pages: 3363-3371 DOI: 10.1002/app.35332 Published: MAY 15 2012 Times Cited: 0 (from Web of Science)
Part 2: Developing an Effective Research Strategy

The “NOT” Boolean Operator

The NOT Boolean Operator is used when you want to find articles that contain one search term but not the other.

If you initiate this search you will obtain articles that contain the words “Mineral Deposit” but not “Mining” in the title field of the article.
Part 2: Developing an Effective Research Strategy

The “NOT” Boolean Operator

- We see that all of the search results contain the words “Mineral Deposit” but not the word “mining.”

- Note: Most experienced researchers rarely use the Boolean Operator “NOT” as they are afraid they will inadvertently screen something out. It is best to stick with the Boolean Operator “OR” and the operator “AND.”
Part 2: Developing an Effective Research Strategy

Effectively Using of Boolean Operators

- **ill-Defined Information Need (Undergraduate Students)**
  
  Using Boolean Operators to broaden or narrow your search can be effective.

- **Defined Information Need (Graduate Students)**
  
  Just use the “AND” operator. To broaden or narrow your search use different search terms and different fields.
Part 2: Developing an Effective Research Strategy

Review of Graduate Study Research Techniques

- Using Search Terms
  1. Add search terms to narrow your search (get less results).
  2. Subtract search terms to broaden your search (get more results).

- Using Database Fields
  1. The *title field* is the narrowest field so you get less results.
  2. The *abstract field* is a broader field so you get more results.
  3. The *default field* searches many fields so you get the most results.

- Using Subject Headings
  Many databases allow you to use the subject headings to link to other related books and articles that have the same subject heading.
Structure of a Database Revisited

Remember when we talk about database fields we are talking about fields within individual records. The default field (e.g. “topic,” “general,” “all fields,” and “default”) is a search parameter.

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Abstract</th>
<th>Subjects (LCSH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of Deletion of Genes Involved in Lipopolysaccharide Core ....</td>
<td>Monadi, A. R.; Mirzaei, H.; Javadi, A.; Hosseinzade, N.;</td>
<td>In this study, the effects of \textit{Lactobacillus casei} \textit{Bifidobacterium angulatum} and</td>
<td>Immunology, Infectious Diseases</td>
</tr>
<tr>
<td>A foodborne outbreak of enterotoxigenic \textit{E. coli}</td>
<td>Wall, Daniel M.; Srikanth, C. V.; McCormick, Beth</td>
<td>When one considers the organism \textit{Salmonella} ....</td>
<td>Pharmacology, Molecular Genetics, Tumor Biology</td>
</tr>
</tbody>
</table>
Using Subject Headings to Find Related Material

A very powerful search strategy is to identify one book or journal article that is relevant to your information need, and then use the Subject Headings to link to other material that uses the same subject heading.

<table>
<thead>
<tr>
<th>Database</th>
<th>Calls its Subject Headings –</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvin Library Catalog</td>
<td>Topics</td>
</tr>
<tr>
<td>Academic Search Premier</td>
<td>Subject Terms</td>
</tr>
<tr>
<td>Medline</td>
<td>Descriptors</td>
</tr>
<tr>
<td>Science Direct</td>
<td>Keywords</td>
</tr>
<tr>
<td>Wiley Interscience</td>
<td>Keywords</td>
</tr>
</tbody>
</table>
Part 2: Developing an Effective Research Strategy

Galvin Library Catalog Subject Headings

A search of the Galvin Library Catalog for “Salmonella” located this book on salmonella.

To link to other books on Salmonella click on the the Topic (e.g. Library of Congress Subject Heading) “Salmonella Typhimurium”
Part 2: Developing an Effective Research Strategy

Galvin Library Catalog Subject Headings

By clicking on the subject heading “Salmonella Typhimurium,” the Galvin Library Catalog has located 2 more books related to Salmonella.
Part 2: Developing an Effective Research Strategy

**Academic Search Premier Subject Headings**

A search of the database Academic Search Premier for “Salmonella” located this journal article.

Prevalence and antimicrobial resistance of *Salmonella* in chicken carcasses at retail in 15 Brazilian cities.

**Alternate Title:** Prevalencia y resistencia a los antimicrobianos de *Salmonella* en pollos congelados de venta al por menor en 15 ciudades del Brasil.

**Authors:** Medeiros, Marcelo Augusto Nunes¹  marcelo.medeiros@anvisa.gov.br
Oliveira, Diana Carmem Nunes de¹
Rodrigues, Dália dos Prazeres²
Freitas, Daniel Roberto Coradi de³

**Source:** Revista Panamericana de Salud Pública; Dec 2011, Vol. 30 Issue 6, p555-560, 6p, 5 Charts, 1 Map

**Document Type:** Article

**Subject Terms:**
*ANIMAL experimentation
*BIOLOGY
*DRUG resistance in microorganisms
*FOOD -- Microbiology
*RESEARCH -- Methodology
*POULTRY
*SALMONELLA

To link to other articles related to *Salmonella* click on the on the subject terms, “Salmonella”
Part 2: Developing an Effective Research Strategy

**Academic Search Premier Subject Headings**

By clicking the subject heading “Salmonella,” Academic Search Premier located 5517 articles that use the subject heading salmonella. You can would narrow these results by adding additional search terms.

1. **A Fundamental Regulatory Mechanism Operating through OmpR and DNA Topology Controls Expression of**
   **Salmonella Pathogenicity Islands SPI-1 and SPI-2.**
   By: Cameron, Andrew D. S.; Dorman, Charles J.. PLoS Genetics, Mar2012, Vol. 8 Issue 3, Special section p1-10, 10p; DOI: 10.1371/journal.pgen.1002615
   Subjects: DNA; TRANSCRIPTION factors; PROTEINS; PROTEIN-protein interactions; GENES; **SALMONELLA**
   Database: Academic Search Premier

2. **Quantification and accurate normalisation of small RNAs through new custom RT-qPCR arrays demonstrates**
   **Salmonella typhimurium RNA interference.**
   Database: Academic Search Premier
Part 2: Developing an Effective Research Strategy

Medline Subject Headings

A search of the database Medline for “Salmonella” located this journal article.

To link to other articles related to Salmonella click on the descriptor “Salmonella”
Part 2: Developing an Effective Research Strategy

Medline Subject Headings

By clicking the subject heading “Salmonella Infections -- Microbiology,” Medline located 4826 articles that use the same subject heading. You can narrow these results by adding additional search terms.

1. Further studies on experimental bacterial pneumonia: ultrastructural changes produced in the lungs by Salmonella cholerae-suis.
   Author: Baskerville A; Dow C; Curran WL, and others Source: British journal of experimental pathology 1973 Feb; 54(1): 90-8
   Libraries Worldwide: 438  See more details for locating this item

2. Characterization of isolates of Salmonella enterica serovar Stanley, a serovar endemic to Asia and associated with travel.
   Author: Hendriksen RS; Le Hello S; Bortolaia V, and others Source: Journal of clinical microbiology 2012 Mar; 50(3): 709-20
   Libraries Worldwide: 1343  Illinois Institute of Technology  See more details for locating this item

3. Application of a 16S rRNA PCR-high-resolution melt analysis assay for rapid detection of Salmonella Bacteremia.
   Author: Jeng K; Yang S; Won H, and others Source: Journal of clinical microbiology 2012 Mar; 50(3): 1122-4
   Libraries Worldwide: 1343  Illinois Institute of Technology  See more details for locating this item

   Author: Rattak U; Leonard N; Bolton D, and others Source: Foodborne pathogens and disease 2011 Jul; 8(7): 769-80
Part 2: Developing an Effective Research Strategy

Science Direct Subject Headings

A search of the database Science Direct for “Salmonella” located this journal article. Science Direct calls its subject headings “Keywords.” Since these subject headings are not hyperlinks you must cut and paste the Keyword directly into the search box and then select “Keyword.”

You must cut and paste the subject heading from the record into the search box, and then choose “Keyword” to initiate the search.
Part 2: Developing an Effective Research Strategy

Science Direct Subject Headings

By cutting and pasting the subject heading “Salmonella” into the search box and initiating the search Science Direct located 2541 articles that relate to salmonella. We can now narrow the search by adding additional search terms (e.g. Food Safety).

To narrow your search results you can type “Food Safety” into the search box.
Part 2: Developing an Effective Research Strategy

**Wiley Interscience Subject Headings**

A search of the database Wiley Interscience for “Salmonella” located this journal article. Wiley Interscience calls it subjects headings “Keywords” and these subject headings must be cut and pasted into the search box.

You must cut and paste the subject heading into the search box, and then choose the “Keyword” field to initiate the search.
Part 2: Developing an Effective Research Strategy

Wiley Interscience Subject Headings

By cutting and pasting the subject heading “Salmonella” into the search box and initiating the search Science Direct located 106 articles that relate to salmonella.

These results can be further limited by adding additional search terms.
Part 2: Developing an Effective Research Strategy

**Wiley Interscience Subject Headings**

Like many other databases, Wiley Interscience gives you the option to locate related articles similar to the article you are looking at.

Clicking this link will automatically generate a list of related records using a combination of subject heading, title, author, and other fields.
Part 2: Developing an Effective Research Strategy

Wiley Interscience Subject Headings

The problem with this type of function (which all of the databases have) is that you have no control over the search parameters and therefore end up generating too many results. However, it may be worth a try.

This number of records is simply too high to work with considering you are not sure how these results were generated. Therefore, it is best to stick with 2-3 words in the title field, and then use different fields and search terms to broaden or narrow your results. You may then link to related items using subject terms.
Part 2: Developing an Effective Research Strategy

Recap of Steps for an Effective Research Strategy

1. **Create a Timeline for Research**
   
   For a research paper give yourselves at least 2-4 weeks for research.

2. **Define Your Information Need**
   
   Our information need was defined as follows: “Identify the chemical processes associated with the browning of fruit.”

3. **Identify Concepts Related to Research**
   
   Our key concepts were –
   
   - Browning,
   - Chemical Processes
   - Fruit
Part 2: Developing an Effective Research Strategy

Recap of Steps for an Effective Research Strategy

4. Consult Subject Specific Experts / Resources

We will use the Food Science and Technology Library Guide to conduct our research - [http://guides.library.iit.edu/FoodSafety](http://guides.library.iit.edu/FoodSafety).

5. Explore General Information Resources

Reference Resources were used to generate additional search terms:

- Enzymatic Browning
- Browning Reaction
- Polyphenol Oxidase – PPO
- Fruit

6. Select The Most Appropriate Database

To be efficient we will search the Food Science Research Databases from top to bottom in the order they appear starting with Web of Science.
7. **Utilize Graduate Study Research Techniques**

1) Start out searching with 2 to 3 search terms in the *title field*.

2) Separated our search terms with a space – same as “AND.”

3) To broaden or narrow our search we will try using the different search terms or different fields (title, abstract, and default field).

4) Once we locate a relevant article or book we will use the Library of Congress Subject Headings to find other related articles or books.
Let’s Start Searching - Terms That Will Be Used

“Browning,” or “Enzymatic Browning,” or “Browning Reaction,” or “Polyphenol Oxidase,” or “PPO” and “Fruit.”
Initiating the Database Search – Web of Science

Select 2-3 search terms separated by a space, same as “And.” Then choose “title” for your search.

Web of Science

Search

Browning Fruit

Example: oil spill* mediterranean

AND

Example: O'Brian C* OR OBrian C*

Need help finding papers by an author?
Use Author Finder.

AND

Example: Cancer* OR Journal of Cancer Research and Clinical Oncology

Add Another Field >>

Initiate the search

Search Clear

Searches must be in English
Part 2: Developing an Effective Research Strategy

Reviewing the Search Results

As you can see the search located 263 records or articles that contain the word “fruit” and some variant of the word “Browning” in the title.
Since we retrieved 263 records we want to narrow are results. Changing the database field to *abstract* or *default* would only give us more results.

To narrow add another search term – “Polyphenol” for “Polyphenol Oxidase”

We added the word “polyphenol” to our search string, but we are still searching in the title field.
Refining the Database Search Results

By adding the search term, “polyphenol” was have narrowed our search results from 263 articles to 18 articles.

Title: Enzymatic Browning, Polyphenol Oxidase Activity, and Polyphenols in Four Apple Cultivars: Dynamics during Fruit Development
Author(s): Holderbaum Daniel Ferreira; Kon Tomoyuki; Kudo Tsuyoshi; et al.
Source: HORTSCIENCE Volume: 45 Issue: 8 Pages: 1150-1154 Published: AUG 2010
Times Cited: 0 (from Web of Science)

Title: Polyphenoloxidase Activity, Polyphenol and Ascorbic Acid Concentrations and Internal Browning in Asian Pear (Pyrus serotina Rehd.) Fruit during Storage in Relation to Time of Harvest
Author(s): Arzani K.; Khoshghalb H.; Malakouti M. J.; et al.
Source: EUROPEAN JOURNAL OF HORTICULTURAL SCIENCE Volume: 74 Issue: 2 Pages: 61-65 Published: APR 2009
Times Cited: 2 (from Web of Science)

Title: Browning in Annona cherimola fruit: Role of Polyphenol oxidase and characterization of a coding sequence of the enzyme
Author(s): Prieto Humberto; Utz Daniella; Castro Alvaro; et al.
Source: JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY Volume: 55 Issue: 22 Pages: 9208-9218 DOI: 10.1021/jf070586 Published: OCT 31 2007
Times Cited: 10 (from Web of Science)

Title: Characterization of polyphenol oxidase from the Manzanilla cultivar (Olea europea pumiformis) and prevention of browning reactions in hybrid olive
Part 2: Developing an Effective Research Strategy

- Using The Computer Program - isit@iit?

“isit@iit?” is not a database but rather a computer program that searches all of IIT’s databases to determine which database accesses the full-text of the journal article that you want.

3 Title: Enzymatic Browning, Polyphenol Oxidase Activity, and Polyphenols in Apple Cultivars: Dynamics during Fruit Development
Author(s): Holderbaum Daniel Ferreira; Kon Tomoyuki; Kudo Tsuyoshi; et al.
Source: HORTSCIENCE Volume: 45 Issue: 8 Pages: 1150-1154 Published: AUG 20
Times Cited: 0 (from Web of Science)

Since Web of Science only accesses the abstract to this article click “isit@iit”
Part 2: Developing an Effective Research Strategy

Using The Computer Program - *isit@iit?*

“*isit@iit?*” has determined that the database “*Highwire Press Free*” accesses the full-text

Highwire Press Free has taken you directly to the full text of the journal article. Depending on the database, you may have to scroll through various years and volumes of the journal to access the full-text.
Refining the Database Search Results

Now will click on Record #3 to demonstrate using your MyILL Account.
Part 2: Developing an Effective Research Strategy

Using The Computer Program - isit@iit?

- If “isit@iit” can not find a database that accesses the full-text of the article that you want you will be prompted to request the article through your MyILL Account.

Since we don’t have a databases that accesses the full-text of this journal you must request this article by clicking on the “MYILL” link.
Part 2: Developing an Effective Research Strategy

Using The Computer Program - isit@iit?

Before you can request an article through your MyILL Account you must login to your account. If you don't have an account, you can create an account by going to https://iit.illiad.oclc.org/illiad/logon.html

Enter your Username and Password, and click “Log in”
The “isit@iit” program has transferred all of the articles data to the article request form. To initiate your request click “Submit Request.”
Part 2: Developing an Effective Research Strategy

Using The Computer Program - isit@iit?

- After you successfully submit your article request you will be transferred to this screen where you can view your “Current Requests.”

You can see your article request information here. It will probably take you around 3-4 days to get your article but it could be longer.
After you receive an email that your article request has been filled you must log back onto your MyILL Account to access your article.

To access your article click “Access Your Articles.”
Part 2: Developing an Effective Research Strategy

Using The Computer Program - isit@iit?

You may now access your article in PDF Format.
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Science Direct

Select 2-3 search terms separated by a space which is the same as the Boolean Operator “And.” Choose the “title” field and then initiate the search.
Part 2: Developing an Effective Research Strategy

Trying another database – Science Direct

The title search for “browning and fruit” located 44 records. To broaden this search (get more results) we would choose a broader field.

47 articles found for: TITLE(browning fruit)

1. A study on polyamine change and browning of fruit during cold storage of litchi (Litchi chinensis Sonn.) Original Research Article
   Yue-Ming Jiang, Fang Chen
   Show preview | Related articles | Related reference work articles

2. Role of pure oxygen treatment in browning of litchi fruit after harvest
   Xuewu Duan, Yueming Jiang, Xinguo Su, Hai Liu, Yuebiao Li, Zhaoqi Zhang, Yonghua Zheng, Weibo Jiang
   Show preview | Related articles | Related reference work articles
Using the exact same search terms we will now select the “Abstract, Title, Keyword” field to broaden our search (obtain more results). This configuration would look for search terms in the title field, the abstract field and also the keyword field.
Part 2: Developing an Effective Research Strategy

Refining a Database Search – Science Direct

The “title, abstract, keyword” search identified 358 articles related to our information need. To narrow these search results to a more manageable number we would add another search term.
Part 2: Developing an Effective Research Strategy

Initiating a Database Search – Science Direct

To narrow our search we will add the search term “polyphenol,” but will continue searching in the same field – “Abstract, Title, Keyword.”

Remember leaving a space between the search terms is interpreted by the database as the Boolean Operator “AND.”
Part 2: Developing an Effective Research Strategy

Initiating a Database Search – Science Direct

Searching for “browning, fruit, and polyphenol” in the title, abstract, or keyword field located 124 articles which is a more manageable number.

1 Influence of dipping in sodium metabisulfite on pericarp browning of litchi cv. Yu Her Pau (Feizixiao) Original Research Article
   Postharvest Biology and Technology, Volume 68, June 2012, Pages 72-77
   Yu Shen Liang, Nan Lun Chen, Lih Shang Ke
   Show preview | Related articles | Related reference work articles

Highlights

- Litchi fruit were dipped in Na₂S₂O₅ and HCl used to recover the pericarp color.
- Browning characteristics and sensory qualities of fruit undergoing these treatments were examined.
- Na₂S₂O₅ can inhibit browning enzyme activity and stabilize anthocyanin structure.
- Na₂S₂O₅ dipping sustains the bright red color of litchi and extend storage life.
Part 2: Developing an Effective Research Strategy

- **Trying Another Database Search – Medline**

Select 2-3 search terms separated by a space which is the same as the Boolean Operator “And.” Then choose the “title” field, and initiate the search.

<table>
<thead>
<tr>
<th>MEDLINE</th>
<th>(Updated: 2010-12-09)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All areas of medicine, including dentistry and nursing</td>
<td></td>
</tr>
<tr>
<td>browning fruit</td>
<td>Title</td>
</tr>
<tr>
<td></td>
<td>Title</td>
</tr>
<tr>
<td></td>
<td>Keyword</td>
</tr>
<tr>
<td>Year</td>
<td>(format: YYYY-YYYY)</td>
</tr>
</tbody>
</table>
Part 2: Developing an Effective Research Strategy

Try Another Database Search – Medline

The title search for “browning and fruit” located 15 records. To broaden this search (get more results) we would switch to the abstract field.

1. Control of rotting and browning of Longan fruit cv. Biew Kiew after harvested by sulphur dioxide treatment under various storage temperatures.
   Author: Chitbanchong W; Sardsud V; Whangchai K, and others Source: Pakistan journal of biological sciences: PJBS 2009 Nov 15; 12 (22): 1438-47 Libraries Worldwide: 445 See more details for locating this item

2. Effects of heat treatment on internal browning and membrane fatty acid in loquat fruit in response to chilling stress.
   Author: Rui H; Cao S; Shang H, and others Source: Journal of the science of food and agriculture 2010 Jul; 90(9): 1557-61 Libraries Worldwide: 703 Illinois Institute of Technology See more details for locating this item

3. Evaluation of the antioxidant properties of litchi fruit phenolics in relation to pericarp browning prevention.
   Author: Duan X; Wu G; Jiang Y Source: Molecules (Basel, Switzerland) 2007; 12(4): 759-71 See more details for locating this item

4. Browning in Annona cherimola fruit: role of polyphenol oxidase and characterization of a coding sequence of the enzyme.
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Medline

Using the exact same search terms we will now select the “Abstract” field to broaden our search, and then initiate the search.
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Medline

By broadening our search for “browning and fruit” to the abstract field we located an additional 107 records in total. Let’s try using the subject headings again to find articles related to our information need.

1. **Identification and characterization of genes differentially expressed in cherimoya (Annona cherimola Mill) after exposure to chilling injury conditions.**
   
   **Author:** González-Agüero M; Cifuentes-Esquível N; Ibañez-Carrasco F, and others  
   **Source:** Journal of agricultural and food chemistry 2011 Dec 28; 59(24): 13295-9  
   **Libraries Worldwide:** 1132  
   [See more details for locating this item]

2. **Factors affecting quality and safety of fresh-cut produce.**
   
   **Author:** Francis GA; Gallone A; Nychas GJ, and others  
   **Source:** Critical reviews in food science and nutrition 2012 Jul; 52(7): 595-610  
   **Libraries Worldwide:** 545  
   [Illinois Institute of Technology]  
   [See more details for locating this item]

3. **Comparative effect of the addition of a- , b-, or g-cyclodextrin on main sensory and physico-chemical parameters.**
   
   **Author:** Andreu-Sevilla AJ; López-Nicolás JM; Carbonell-Barrachina AA, and others  
   **Source:** Journal of food science 2011 Jun-Jul; 76(5): S347-53  
   **Libraries Worldwide:** 915  
   [Illinois Institute of Technology]  
   [See more details for locating this item]

4. **The effectiveness of ozone and acidulant treatments in extending the refrigerated shelf life of fresh-cut potatoes.**
   
   **Author:** Calder BL; Skonberg DJ; Davis-Dentici K, and others  
   **Source:** Journal of food science 2011 Oct; 76(8): S492-8  
   **Libraries Worldwide:** 915  
   [Illinois Institute of Technology]  
   [See more details for locating this item]

5. **Enhancement of Biocontrol Activity of Cryptococcus laurentii by Silicon and the Possible Mechanisms Involved.**
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Medline

Let’s assume we looked all these articles and then came to #80 and clicked on the abstract. To locate more articles like this one we would click on the Descriptor “Fruit – Chemistry” to link to articles with the same subject heading.

Click on the Descriptor “Fruit – Chemistry” to find other relevant articles.
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Medline

Using “Fruit – Chemistry” we identified 10442. This is obviously too high to work with so let’s use this subject heading on conjunction with a title search. Click on searching.

1. A new benzoylphloroglucinol derivative with an adamantyl skeleton and other constituents from *Garcinia multiflora*: effects on neutrophil pro-inflammatory responses.  
   Author: Ting CW; Hwang TL; Chen IS, and others  
   See more details for locating this item

2. Myrigalone A inhibits Lepidium sativum seed germination by interference with gibberellin metabolism and apoplastic superoxide production required for embryo extension growth and endosperm rupture.  
   Author: Oracz K; Voegele A; Tarkowská D, and others  
   See more details for locating this item

3. Isoforsythiaside, an antioxidant and antibacterial phenylethanoid glycoside isolated from *Forsythia suspensa*.  
   Author: Qu H; Zhang Y; Chai X, and others  
   Illinois Institute of Technology See more details for locating this item
Trying Another Database Search – Medline

Another effective search strategy is to cut and paste a subject heading into the search box and then do a title search for 1-2 relevant words. This is a very effective search strategy if you find that the same subject heading is being used over and over again in articles that relate to your topic.

Paste the Descriptor exactly as it appears, and select MeSH Heading which stands for Medical Subject Headings.

Make sure the Boolean Operator “And” is chosen and then use the word “Browning” for a title search. Initiate the search.
Part 2: Developing an Effective Research Strategy

Trying Another Database Search – Medline

By using subject headings and relevant search term in the title field you have identified 24 highly relevant articles.

1. Control of rotting and browning of Longan fruit cv. Biew Kiew after harvested by sulphur dioxide treatment under various storage temperatures.
   Author: Chitbanchong W; Sardsud V; Whangchai K, and others Source: Pakistan journal of biological sciences: PJBS 2009 Nov 15; 12 (22): 1438-47 Libraries Worldwide: 445 See more details for locating this item

2. Effect of harvesting index on browning reaction and changes of tissue structure in santol fruits.
   Author: Benjawan C; Chutichudet P; Khumkratok S Source: Pakistan journal of biological sciences: PJBS 2008 May 1; 11(9): 1212-9 Libraries Worldwide: 445 See more details for locating this item

3. Browning in ethanolic solutions of ascorbic acid and catechin.
   Author: Chuang PT; Shen SC; Wu JS Source: Journal of agricultural and food chemistry 2011 Jul 27; 59(14): 7818-24 Libraries Worldwide: 1132 See more details for locating this item

4. Effects of heat treatment on internal browning and membrane fatty acid in loquat fruit in response to chilling stress.
   Author: Rui H; Cao S; Shang H, and others Source: Journal of the science of food and agriculture 2010 Jul; 90(9): 1557-61 Libraries Worldwide: 703 Illinois Institute of Technology See more details for locating this item

5. Kinetics of anthocyanin degradation and browning in reconstituted blackberry juice treated at high temperatures (100-180 degrees C).
Part 2: Developing an Effective Research Strategy

**Review of Graduate Study Research Techniques**

- Use no more than 2-3 words and start out in the title field.
- Separate your search terms with a space which is same as “AND”.
- If you get too many results then you can add another search term or try a different search term.
- If you get too few results you can -
  1. Subtract a search term or try a different search term.
  2. Select a broader field like the abstract or default field.
- Identify one article that is particular relevant and then use the subject headings to link to other material with the same classification.