

## Brewery Project Literature Search

**Goal:** Search the scientific literature to find a published procedure suitable for the analysis of the desired components of the Upland Brewery beer. You must be able to accomplish the procedure with the instrumentation that is available in the A316 laboratory.

### Instrumentation Available:

GC-MS with automated analysis of analytes in solution or manual injection for SPME (solid phase microextraction or headspace analysis)

UV-Vis spectrophotometer.

Fluorescence spectrophotometer.

HPLC with reversed phase column (C18, C8) with diode array detector (UV and VIS).

CE with UV-Vis diode array detector.

AA with the following lamps (Lamp 1: Ca, Mg, Zn Lamp 2: Co, Cr, Cu, Fe, Mn, Ni)

Also: wet chemical methods such as titrations with indicators or pH/ conductivity meters may be used.

### Instructions:

- 1) Meet with your lab section and form groups of 2 or 3 members. (You must work with someone who has not been your lab partner already.)
- 2) There are 5 different analyses below. Each group should select one.
- 3) By next Friday you should do the following assignment. **(15 points)**
  - a. Each group should search the scientific literature for a procedure capable of performing the analysis of the specific component of beer and bring the reference they have found to turn in in lab lecture. Write a paragraph (or two) explaining how you decided that the method selected was the best one. Also write down any questions that you may have about making the decision.
  - b. Make a preliminary list of the supplies needed along with the cost. You will need to go to the manufacturers websites (i.e. [www.sigma-aldrich.com](http://www.sigma-aldrich.com)) and look up the product. A format for your supply list is shown in the table below. You should account for 5 students groups doing the analysis with enough reagent to perform the experiment 3 times.

Item	Supplier	Name	Number of units	Catalog Number	Price
1	Sigma Aldrich	Ammonium ferric citrate (green)	1	09713-50g	\$29.60

Next Friday (3/1) your group will meet with groups from other lab sections that are performing the same analysis. You will have a discussion and compare procedures to decide which is best. You will submit this reference and list of supplies that should be ordered. **(10 points)**

For your interest, the laboratory services for beer analysis from the Siebel Institute of Technology have been attached. These are common analyses done on source water and beer at various stages in the brewing process. After consulting with Caleb Staton, the head brewmaster at the Upland Brewery, the analyses to be done by the A316 class are listed below. Your group will pick one.

Analysis 1: Bitterness Units (Iso-alpha acids)

Analysis 2: Iron (in beer and in source water) (Zinc, if time permits)

Analysis 3: Chloride and Oxalate ion (in beer and source water)

Analysis 4: Diacetyl (butterscotch flavor)

Analysis 5: Total Polyphenols and Protein

Use Internet Resources (Google Scholar) and SciFinder Scholar to search the peer reviewed scientific literature for procedures to perform the specified analysis for your group. You must find at least one published peer-reviewed (not a few pages off the internet) procedure for the analysis.

### SciFinder Scholar

An extremely useful tool for finding scientific information is *SciFinder Scholar*, a Windows (and Macintosh) software package that connects through the Internet for the purpose of locating and processing information from the *Chemical Abstracts database of the National Library of Medicine (3900 journals from 70+ countries)*. SciFinder Scholar requires little knowledge of command language or database intricacies, thus allowing direct end-user access to Chemical Abstracts mostly from 1907 onwards and Medline from 1950 onwards. With SciFinder Scholar you can choose to search by research topic, author name, CA abstract number, patent number, chemical structure, molecular formula, chemical name, CAS registry number, functional groups in reactions, and bibliographic information. SciFinder Scholar covers journal articles and patents together in one source, substance data, chemical reactions, chemical regulatory data, chemical suppliers, and biomedical literature.

The system will search the Chemical Abstracts database of more than 25 million titles and abstracts of journal articles, patents, dissertations, reports, and other literature, with information on more than 31,000,000 (as of March 2007) organic and inorganic substances, and over 57,000,000 sequences. There are more than 12,400,000 single- and multi-step reactions in CASREACT (as of March 2007). MEDLINE contains more than 15,000,000 references.

The journals encompass a wide range of scientific disciplines such as chemistry, biology, physics, geology, environmental science, psychology, and medical research. A sampling of journal titles follows: Nature, Science, Journal of the American Chemical Society, Analytical Chemistry, Surface Science, Recent patents in Nanotechnology, Recent patents in Endocrine, Metabolic and Immune Drug Discovery, Toxicological and

Environmental Chemistry, Physiology and Behavior, Genomics, and Cancer Research. A complete list of core journals and patents may be found at <http://www.cas.org/expertise/cascontent/caplus/corejournals.html>.

**Very Important:** The IU system pays around \$129,120 for only 16 seats. Therefore, there are only 16 total licenses for the entire Indiana University system. At times, you may not be able to use this database if there are 16 other individuals logged in.

You can use the web-based license by following the instructions below.

Go to the chemistry library home page (<http://www.libraries.iub.edu/index.php?pageId=78>) and click on the *SciFinder Scholar* Database on the right hand side of the page. Now scroll down and click on Web Version Log In: SciFinder Log In. Create an account so you can log in.

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