Organic Chemistry Laboratory
Dr. Ramberg

Extraction of Fat from Food

In this experiment, you will devise a procedure for extracting the fat from the junk food of your choice by using a set of generalized principles that we discussed in class. Remember that fats are non-polar, triglycerides (see your textbook if necessary), and can be saturated, unsaturated or polyunsaturated.

New techniques

There are no specific new techniques for this lab, only an elaboration of techniques from the first extraction experiment.

Prelab:

Prepare a general scheme for your extraction based on the guidelines below and your specific choice of junk food. This is in addition to the usual things to record in the notebook such as title of the experiment, date, purpose, etc.

Lab Report:

Report the amount of fat you isolate from your junk food and compare to the amount given on the package. Is there any way you could improve on your results? In a separate section, give a literature style experimental description (see the back of this page) of the actual procedure that you followed as recorded in your notebook.

Procedure:

Be sure to weigh out the starting amount of junk food.
Fats are soluble in ether or methylene chloride.
There are also may be materials that are either water soluble or not soluble in any liquid.
Determine the amount of fat isolated.
Record your specific procedure carefully in your lab notebook.
Test for unsaturation with potassium permanganate and bromine solution.

Literature Style Experimental Descriptions

Journal articles in the chemical literature often have an "experimental" section, which contains descriptions of the procedures used to make all the new compounds reported in the article. The style of this section is extremely rigid. An example of the preparation of ferrocene (an organometallic compound) is given below (for additional examples, look at any recent issue of a chemistry journal in the library):

> **Ferrocene:** Cyclopentadiene (2.8 mL, 40 mmole, 1.25 eq) was added dropwise to a vigorously stirred slurry of potassium hydroxide (8.0 g, 142 mmol, 4.4 eq) in dimethoxyethane (16 mL), and the mixture stirred for 10 minutes. A solution of ferrous chloride tetrahydrate (3.2 g, 16 mmole, 1 eq) in dimethylsulfoxide (15 mL) was added, the mixture stirred 10 min, and then poured over a mixture of ice (ca 50 g) and 6M hydrochloric acid (35 mL). Crude ferrocene was isolated by vacuum filtration, and washed with water. Sublimation at reduced pressure (70°/30 mm Hg) provided pure ferrocene (xx g, xx%) as orange crystals, mp xx C°.

This description is written extremely tersely, with no mention of actual procedure or trivia, such as the size or kind of flask used, the heat source, etc. The writer assumes that the reader knows the basic techniques of the laboratory. Notice also that there is no mention of theory, or theoretical interpretation, only a description of activities carried out in lab and the resultant properties of the new compound. Other possible information contained in these descriptions would be spectral data (ir absorbances, chemical shifts in the nmr spectrum, etc.), R_f values with the solvent system used, molecular weights from mass spectra, or elemental analysis results. Every paper also has a general preamble at the beginning of the experimental section that describes the machine that took spectra, melting point apparatus, type of silica gel used in chromatography, how standard reagents were prepared, and so forth.

The purpose of these descriptions is, of course, to allow any preparation to be replicated in another laboratory. Communicating results to other chemists to enable their replication is one of the hallmarks of modern science. Not surprisingly, unreplicable procedures are useless, no matter how ingenious or worthwhile. They are kept short for two reasons. First, chemists already know the basic procedures of extraction, distillation, etc., or they know where to find them. Second, short descriptions take up less space in a journal, which can charge a researcher by the page for publication.