

How Greasy is Your Food?

You have probably noticed that your hands, or worse yet, your clothing have become greasy after a meal or snack. Fats and oils belong to the organic group of lipids. They have the general formula of $C H O$. Fats are from animal sources and lipids are from plant sources. Fats are solids at room temperature and the oils are liquids. Lipids are a chemical combination of one glycerol (an alcohol because of the $-OH$ group attached to the hydrocarbon chain) and three organic acids (characterized by a $-COOH$ functional group attached to a hydrocarbon chain).

In this experiment, you will extract the fat from a food sample by boiling it in water. You will then make a rough determination of the percentage of fat in a sample and a serving of the selected food.

Procedure:

1. Select a food source to perform the fat analysis on. You will need about 25 grams of food.
2. Place the sample in a 250-mL or larger beaker.
3. Add enough water to cover the sample. Stir thoroughly and bring to a boil.
4. Gently boil the sample for 15 minutes. Be careful not to allow the sample to dry out/burn. You may need to add water periodically.
5. Remove the beaker from the heat. Add 50 mL of water to the sample. Allow the sample to settle to the bottom. The lipid layer will rise to the surface.
6. Carefully pour off the fat layer into a clean 50-100 mL graduated cylinder. It may be difficult to remove the last traces of lipid. When the sample cools (you may use an ice bath), pick out the solidified fat particles. Add these to the graduated cylinder.
7. Read the volume of fat in the cylinder. You are assuming that 1.0 mL is roughly equivalent to 1.0 gram of lipid.
8. Calculate the percentage of fat in the sample.
9. Calculate the amount of fat in a serving of your selected food.

grams of lipid in a serving = grams of a serving X percentage of lipid in the sample

10. If every gram of fat has 9 Calories, how many calories (from fat) does a serving of your food contain?

food sample being analyzed: _____

mass of sample	
volume of fat	
mass of fat	
% fat in the sample	
mass of a serving	
amount (g) of fat in a serving	
fat calories in a serving	

food sample being analyzed: _____

mass of sample	
volume of fat	
mass of fat	
% fat in the sample	
mass of a serving	
amount (g) of fat in a serving	
fat calories in a serving	

food sample being analyzed: _____

mass of sample	
volume of fat	
mass of fat	
% fat in the sample	
mass of a serving	
amount (g) of fat in a serving	
fat calories in a serving	

US Food and Drug Administration

To: Consumer Affairs Research Division

**From: John Caloric, Administrator
Food and Drug Administration (FDA)
North Central Regional Office**

Re: Chip Fat Content

The FDA recognizes the need for a more informed public and forthright food industry with regard to healthy food choices and product labeling for the American public. Research indicates that more often than not advertising and even the nutritional labeling on food products are misleading. As a result, the FDA is undertaking the responsibility of evaluating various common food types. You are being hired to complete our first evaluation in which we have targeted an old American favorite - potato chips. It is your task to determine the amount of fat in various types and brands of potato chips (or snack chips). Specifically, we need the following information for all chops tested by your research department:

Amount of fat in a single serving of each type of chips (as stated on the package)

Amount of fat in a single serving of each type of chip (by water extraction)

Fat calories in a single serving (1 gram of fat = 9 calories)

Percent of total calories from fat

$$(\text{fat calories} / \text{total calories}) * 100 = \%$$

We are looking to publish the results of this analysis soon so I will need your report within the week. Please provide data, costs, calculations, graphs, and your recommendations. I look forward to reading your report.

Budget: \$35 000

Possible costs:

Lab space/fume hood/utilities	\$15,000 per day
Standard disposal fee	2,000 per gram of product used
400 mL beaker	2,000
250 mL beaker	1,000
graduated cylinder	1,000
Glass stir rod	1,000
Ring stand, ring, gauze pad	1,000
Water bottle	500
Weigh paper	500 per sheet
OSHA violation	2,000 per violation
Electronic balance	5,000 per day
Bunsen burner	5,000 per day