

Solvent Extraction Lab

Chemistry 30: Organics

Name _____ Partner _____ Date _____ Score _____

Purpose:

- To determine the percentage of fats in selected foods
- To experience solvent extraction
- To differentiate between saturated and unsaturated fats

Materials: Samples of peanuts, (Planter's salted), potato chips (Ruffles), Chocolate chips (Hershey's chipits)
Beakers
Mortar and pestle
Acetone
Petri dishes

Procedure:

1. Weight about 6 g of a food sample and crush finely. Use the mortar and pestle.
2. Label and weigh a clean beaker for this sample. Record the mass of the beaker and label.
3. Add the sample of crushed food into the labeled beaker and weigh again. Record this value.
4. Add about 20 mL of acetone to the beaker. Be sure to use the fume hood as the fumes will be noxious.
5. Swirl the beaker carefully for 2 – 3 minutes to allow the fat to be extracted into the acetone.
6. Carefully decant the acetone into a clean labeled petri dish making sure that all of the solid particles remain in the beaker.
7. Add another 20 mL sample of acetone to the beaker.
8. Again swirl for 2 – 3 minutes. Again decant the acetone to the petri dish. And again make sure that all the solid particles remain in the beaker.
9. Now weigh the beaker and the remaining solids particles. Record. Note this is the mass of the food sample with the fat removed!
10. Allow the petri dish to evaporate in a fume hood overnight.
11. Repeat steps 1 → 10 for each food sample. (potato chips, chocolate chips and peanuts).

Observation table:

Complete the table below to determine the amount of fat extracted and hence the percentage of fat in each food.

Food type	Weight of empty beaker (g)	Weight of beaker with crushed food (g)	Weight of food (Calculate this) (g)	Weight of beaker with food particles after fat extraction (g)	weight of extracted fat = weight of food – weight of food with fat extracted.	% fat extracted Calculate Weight of fat / weight of food
Peanuts						
Chocolate Chips						
Potato Chips						

Analysis:

Calculate the percentage fat in each food using the values from the Nutritional facts box on the label on the food packet.

Food Type	Serving Size (g)	Weight of fat per serving from Nutrition Facts Box (g)	% fat in food according to the label	% fat recovered by acetone extraction = experimental % fat / label % fat
Peanuts (Planters salted)	50	27		
Chocolate Chips (Hersheys Chipits)	15	5		
Potato Chips (Ruffles)	50	18		

Solvent Extraction Lab: Organic Unit

- Fats are classed as 'saturate' or unsaturated. What does this mean? Be sure to discuss bonding and what the expected state might be at room temperature.
- The nature of the extracted fats will be different. Some will form a white solid and some will form a liquid. Use this information to determine which of the food types have saturated and which have unsaturated fats.
- Many foods say "do not contain trans fats'. Do some research and describe the difference between cis and trans fats. Be sure to include health issues.
- **Acetone** , $\text{OC}(\text{CH}_3)_2$, is the solvent used to remove the fats from the foods. This colorless, flammable liquid is the simplest example of the ketones. Owing to the fact that acetone is miscible with water it serves as an important solvent in its own right, typically as the solvent of choice for cleaning purposes in the laboratory.
 - If acetone is miscible in water, then its bonding makes it a (polar or non polar) molecule.
 - If fats dissolve in the acetone, then they must have (polar or non polar) molecules.
 - Acetone is very volatile and will easily dissolve leaving only the solute of fats. The boiling point of acetone is _____ °C

<http://en.wikipedia.org/wiki/Acetone> look for information about acetone here.