

Separating mixtures (a forensic exercise)



Advertising can sometimes be misleading. Packaging is aimed at being attractive and inviting while not always portraying the true facts about the food inside the package. High amounts of oil in the diet can be very unhealthy. But like sugar, oil and other fats lurk in our diet without us even being aware of their presence. Such foods are part of food mixtures that we consume as part of our quick, take-away diets.

This activity will enable you to see the true fat/oil content of a range of foods, mainly chips. Oil in the food will be separated by dissolving it in a chemical called acetone. You may know of it as nail polish remover.

Let's get started.

Apparatus.

- 1 X small packet of normal, unflavoured chips (brand not important).
- 1 X small packet of the same brand of chips but advertised as "Lite or Oven Baked"
- 25 mL of acetone (flammable)
- 2 X large evaporating dishes
- 1 X Mortar and pestle
- 1 X Electronic scales
- 1 X 30 mL measuring cylinder
- 1 X Glass stirring rod
- 1 X plastic or glass medium sized funnel
- 1 X round filter paper (approximately 10 cm diameter)
- 1 X 100 mL glass beaker



Procedure :

Step 1 – Using the electronic balance weigh one of the evaporating dishes. Record the results in an appropriate table.



Step 2 – Place 2 large, normal chips in the evaporating dish that was weighed in step 1 and reweigh the chips and evaporating dish. Record the result.



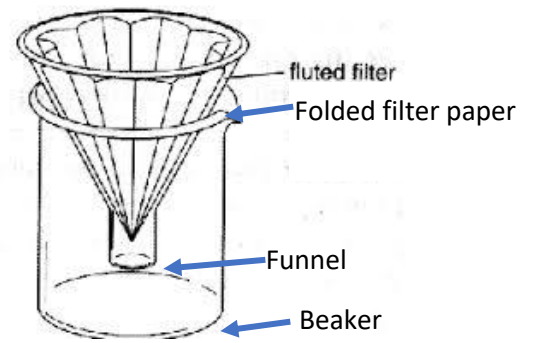
Step 3 – Transfer the chips from the evaporating dish to a mortar. Using the pestle carefully and slowly crush the chips into fine particles. Take care so that no particles are lost from the mortar.



Step 4 – Measure 25 mL of acetone using the measuring cylinder.



Step 5 – Fold the filter and place it in the funnel. Rest the funnel in the beaker as shown on the right.



Step 6 – Pour 15 mL of acetone into the mortar with the crushed chips. Stir gently with a glass stirring rod for 5 minutes, before pouring the contents of the mortar slowly into the filter paper. Wash the chips out of the mortar and into the filter paper using the remaining 10 mL of acetone.



Step 7 – Weigh the other evaporating dish and record the result.



Step 8 – Transfer the contents of the beaker into the evaporating dish that was weighed in step 7 and place in a fume-cupboard overnight to allow the acetone to evaporate.

Step 9 – Once the acetone has evaporated oil will be visible in the evaporating dish. Weigh the evaporating dish and oil content and record the result.



Step 10 – Repeat step 1-9 using an alternative brand of chips.

Table of results for normal brand

Item weighed	Mass (g)
1) First evaporating dish	
2) First evaporating dish and chips	
3) Total mass of chips = 2) – 1)	
4) Mass of second evaporating dish	
5) Mass of second evaporating dish and oil	
6) Mass of oil = 5) – 4)	

Table of results for alternative brand

Item weighed	Mass (g)
1) First evaporating dish	
2) First evaporating dish and chips	
3) Total mass of chips = 2) – 1)	
4) Mass of second evaporating dish	
5) Mass of second evaporating dish and oil	
6) Mass of oil = 5) – 4)	

Brand name	
Mass of oil (g)	
Mass of chips (g)	
Percent by mass of oil in the chips (%)	$\frac{\text{Mass of oil}}{\text{Mass of chips}} \times 100 =$
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Questions

1. What solvent was used to dissolve the oil?
2. Explain why water is not used to dissolve the oil
3. What separating technique was used to separate the oil from the chips?
4. What separating technique was used to separate the oil from the acetone?
5. What percent of the mass of the chips is due to oil?
 - a. What mass of oil is eaten if one packet of chips is consumed of each brand?
 - b. Measure out this amount of oil using a measuring cylinder and take a picture of the measuring cylinder.
6. Investigate the damage done to organs, such as the heart and arteries from over use of junk-food.

7. Construct an A4 poster alerting consumers to the dangers lurking in our fast food industry.
8. Suggest another investigation of interest that can be conducted that would allow us to expose the dangers of other common foods. Suggest a reason why this investigation you have chosen is of importance.
Suggestions may include:
- oil in hot chips from the tuck-shop
 - fat/oil present in a whole muffin.
 - oil/fat present in pop-corn
 - are oven baked chips healthier?
 - dried vegies are marketed as “Veggie-Goodness” and sold in Supermarkets. Are they a healthier alternative?



Poster

What am I eating?



Would you drink this amount of oil?



Explanation and results.