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| Food Chemistry |
| Determining the amount of fat in crisps |
| Teacher/technician guide |





## Introduction

It is well known that crisps, due to the usual mode of cooking (deep-frying in oil) contain a significant amount of fat.

It is a relatively straightforward task to extract this fat, using a suitable solvent), to enable to amount of fat to be determined.

## Each group will need

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| Boiling tube | Delivery tube (glass) |
| Test tube | 2 Beakers 250 - 100 cm3 |
| Ice water | Hot water from kettle (70 °C) |
| Propanone (or other solvent) |  |

## Method

1. Accurately weigh out ~ 3g of crisps and crush them in a pestle & mortar
2. Placed the crushed crisps in a test tube and add propanone to about 1 cm above the solid ~ 10 cm3
3. Place a stopper in the test tube and shake the mixture, gently to begin with.

*Remove the stopper from time to time to release any pressure then replace and continue shaking.*

1. Place a plug of glass wool in the neck of a filter funnel and filter the mixture carefully into a boiling tube.

*The filtrate contains the fat dissolved in propanone.*

1. Set up the equipment for distilling the solvent as shown below.



1. Carefully distil the solvent until no more comes over into the receiving tube. Top up the hot water from time to time if needed.

*The recovered propanone can be kept and re-used for another extraction*

1. Pour the remaining fat and solvent mixture into a weighed crystallising dish and place on the hot plate to remove the last traces of solvent. (Alternatively, it can be left for a few days to evaporate at room temperature.
2. Allow to cool, and then reweigh. This gives you the mass of fat/oil

## Calculations

To determine the percentage of fat.

Divide the mass of fat/oil by the mass of crisps you started with.

Multiply by 100 and that is percentage fat

## Safety

Propanone is highly flammable, Do net be tempted to heat it using a naked flame. Keep well away from any source of ignition.

Propanone fumes are respiratory irritants so work in a well-ventilated laboratory

## Notes and extensions

An interesting study could be made using a variety of other relatively low hazard solvents to see if there is a difference in effectiveness of extraction. Some possible examples are ethanol (IMS) Propano1s and ethyl acetate. But there are others that could be used.

PET ethers are perhaps more effective solvents but are probably best avoided as they are carcinogenic, mutagenic and target organ toxins. If used they should be handled in a fume cupboard.

The technique could be used to investigate the fat content of ‘normal’ versus baked crisps as well as other snacks such as the puffed wheat variety (Wotsits, Monster Munch etc)

It could perhaps be extended to other foods. However, the presence of water tends to interfere with the dissolving of the fats so the technique may not work for things like milk and creams.

## Acknowledgement

This activity has been adapted from one produced by Shona Scheurl for the RSC