



Home Science Resources:

Emulsions Part 1 & 2

This video explores **emulsions** as a mixture of two liquids that usually don't mix (such as oil and water), where one liquid is dispersed in another – such as oil droplets dispersed within water. It looks at **water being a polar, hydrophilic molecule**, and **oil being a non-polar hydrophobic molecule**, as an explanation as to why they don't mix. It then goes on to look at **emulsifiers** such as washing up liquid and explains the science behind them.

Part 2 explores **oil-in-water emulsions** (such as milk and cream) and **water-in-oil emulsions** (such as butter). Students will have the opportunity to make whipped cream, and then butter, from double cream to switch an oil in water emulsion to a water in oil emulsion!

By the end of this video you will:

- Understand what an emulsion is and where emulsions are found in your kitchen
- Understand why oil and water don't mix together
- Learn what an emulsifier is and why they are important
- Have a go at changing an oil in water emulsion to a water in oil emulsion by making butter!

Enjoy your butter on your toast or your scones – don't forget to send us in your pictures!

What will you need for this video:

- Some water (preferably in a jar with a lid so you can shake!)
- A small amount of oil
- Some washing-up liquid
- Double cream and a tall jar (with lid) for Part 2 of the experiment.

Do make sure your lid is on tight, when shaking your water + oil and your cream! Store your butter (and buttermilk) in the fridge after shaking, to ensure it doesn't go rancid. You need to shake for around 10-15 minutes to make your whipped cream, and then a further couple of minutes to make your butter!

Please do send us in your pictures and videos at ncbe@reading.ac.uk, Tweet @natbiotech or Instagram @readingunifood

We'd love to know how you got on!



Glossary - in case you need a recap of any of the terms!

Emulsifier – a molecule that contains both a hydrophobic part (water-hating tail) and a hydrophilic part (water-loving head), which slow down or prevent the separation of oil and water.

Emulsion – a mixture of two immiscible (not usually able to mix) liquids, such as oil in water. When shaken, one liquid will form tiny droplets and disperse within the other liquid. They contain both a dispersed phase and a continuous phase.

Hydrophilic – a molecule described as being water-loving, as its interactions with other polar, hydrophilic substances (such as vinegar and alcohol) are more favourable than with hydrophobic molecules.

Hydrophobic – a molecule (such as oil) described as water-hating, they will separate from water. Usually hydrophobic molecules are non-polar.

Non-polar – a molecule where the electrical charge is evenly distributed across the molecule.

Oil-in-water emulsion – an emulsion where oil droplets are dispersed within water, such as milk, mayonnaise or double cream

Polar – a molecules where one end has a positive electrical charge (so as the hydrogen atoms in water) and the other end has a negative electrical charge (such as the oxygen atoms in water). Generally polar molecules dissolve well in water, and other polar solvents such as ethanol.

Water-in-oil emulsion – an emulsion where water droplets are dispersed within oil, such as butter or margarine.

We'd love to know how you got on!



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