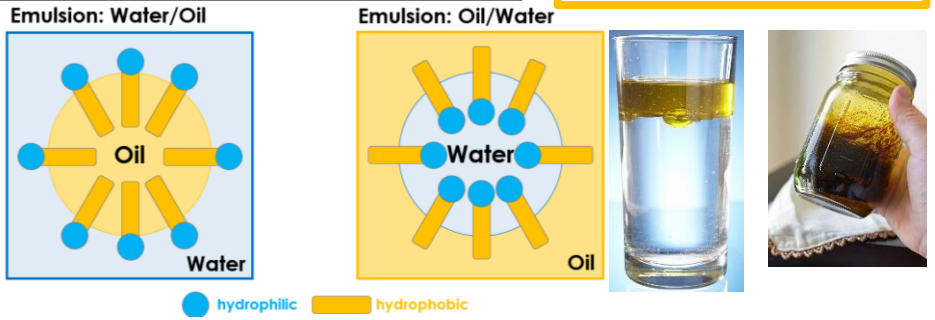
Food Preparation and Nutrition
Food Science

Emulsification



Vegetable oils do not dissolve in water. If oil and water are shaken together, tiny droplets of one liquid spread through the other liquid, forming a mixture called an emulsion.

Emulsions are **thicker** (more viscous) than the oil or water they contain. This makes them useful in foods such as **salad dressings and ice cream**. Emulsions are also used in **cosmetics** and **paints**. There are two main types of emulsion:
Oil droplets in water (milk, ice cream, salad cream, mayonnaise)
Water droplets in oil (margarine, butter, skin cream, moisturising lotion).
If an emulsion is left to stand, eventually a layer of oil will form on the surface of the water. **Emulsifiers** are substances that **stabilise** emulsions, **stopping them separating** out.

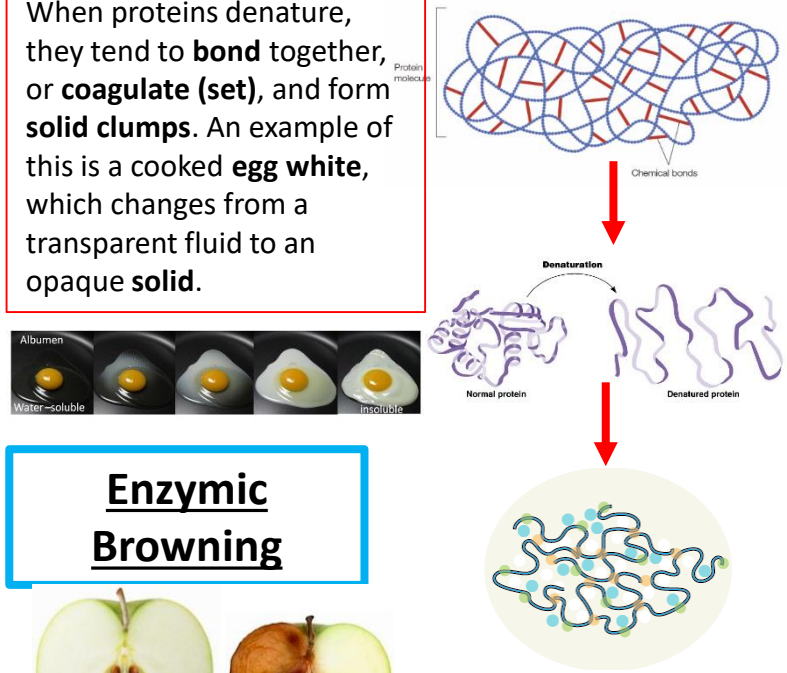
Egg yolk contains a natural emulsifier. Mayonnaise is a stable emulsion of vegetable oil and vinegar with egg yolk.

Emulsifier molecules have two different ends:
a **hydrophilic end** - **'water-loving'** - that forms chemical bonds with water but not with oils
a **hydrophobic end** - **'water-hating'** - that forms chemical bonds with oils but not with water.

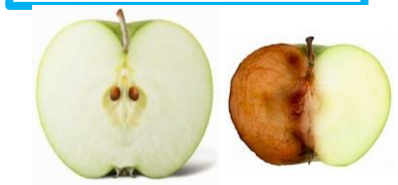
Denaturation and Coagulation

The structure of protein changes when heat or mechanical action (beating) is applied. This causes the tangled up protein molecules to unravel.

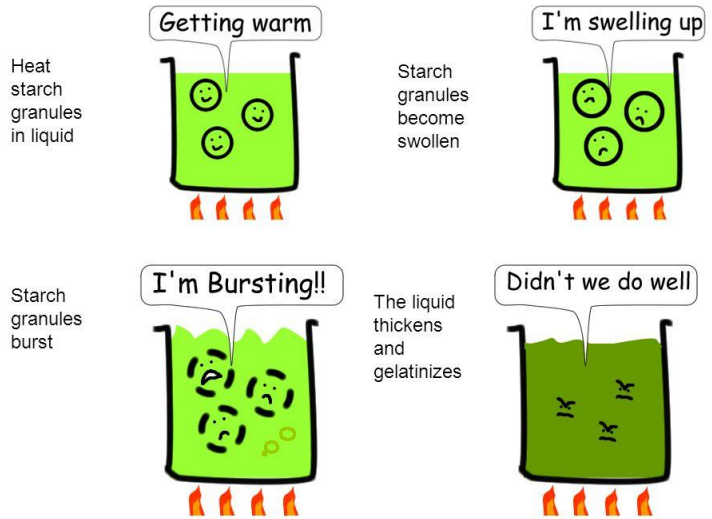
When proteins denature, they tend to **bond** together, or **coagulate (set)**, and form **solid clumps**. An example of this is a cooked **egg white**, which changes from a transparent fluid to an opaque **solid**.



Enzymic Browning



Gelatinisation



Starch gelatinizes when heated in a liquid, producing a thickened liquid

Starch particles do not dissolve in water

They form a 'suspension'

If the suspension is not stirred, the starch particles sink to the bottom and stick together to form lumps

If heated to **60°C** the starch particles will begin to absorb the water and swell

If heated to **80°C** the particles will absorbed up to 5 times their volume of water, until eventually they burst, releasing starch and thickening the liquid.

Dextrinisation

When a starch (e.g. flour) is cooked in a dry heat (example oven), **dextrins** are produced. This process is called dextrinisation.
Dextrins are a *monosaccharide*- a type of sugar. This means they have a ***sweeter*** *taste* than starch.
Dry heat (oven/grill) causes starch to change colour, texture and flavour.
Starch changes to **dextrin**.