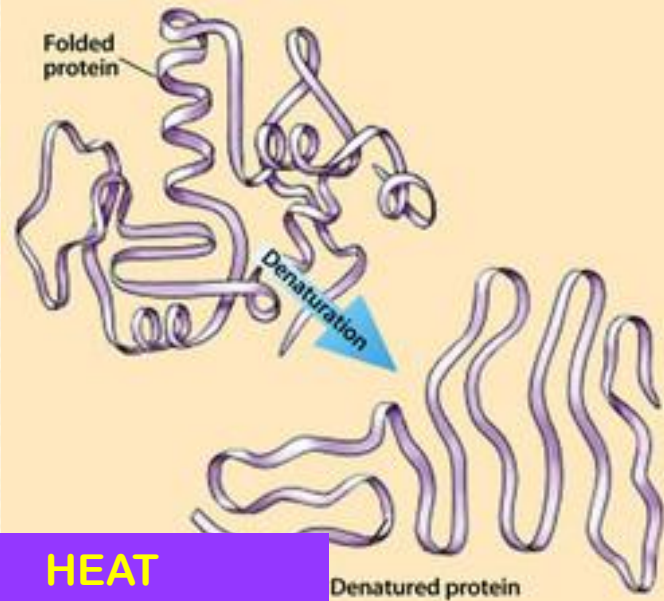


PROTEIN

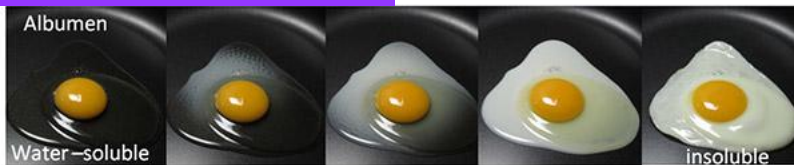
DENATURING



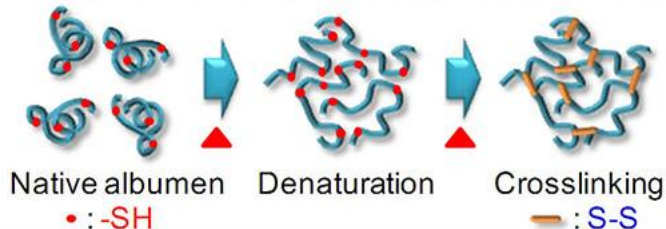
PROTEINS DENATURE THROUGH:

- HEAT
- ACID
- MECHANICAL AGITATION (WHISKING)

HEAT
e.g frying an egg



(b) Protein Thermal Irreversible Denaturation



ACID
e.g marinade



WHISKING
e.g meringues



e.g making cheese

**FUNCTION & CHEMICAL
PROPERTIES**

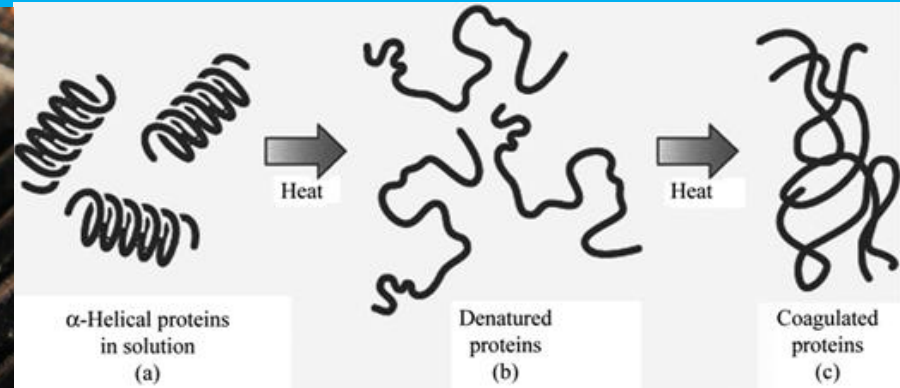
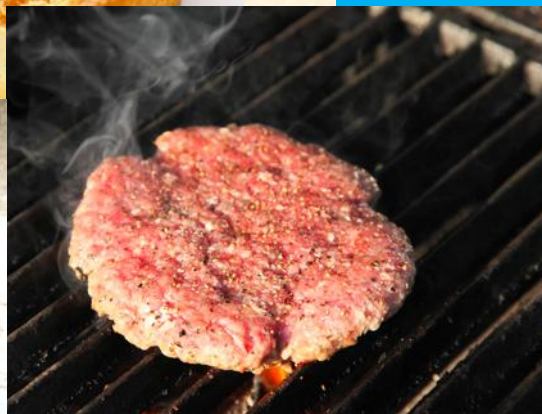
PROTEIN

PROTEIN

COAGULATION

COAGULATION is a vital **CHEMICAL PROCESS** in which proteins in a liquid state is changed to a **SOLID STATE** and it can only occur after the substance has gone through denaturation.

Coagulation can only occur in the **PRESENCE OF HEAT**. When a protein substance is going through coagulation, the strands of protein or amino acids start to vibrate from the applied heat and therefore making the strands move around and tangle with the rest of the protein strands, resulting in **CLUMPS OF PROTEIN**.



PROTEIN

Water is added to Strong Flour

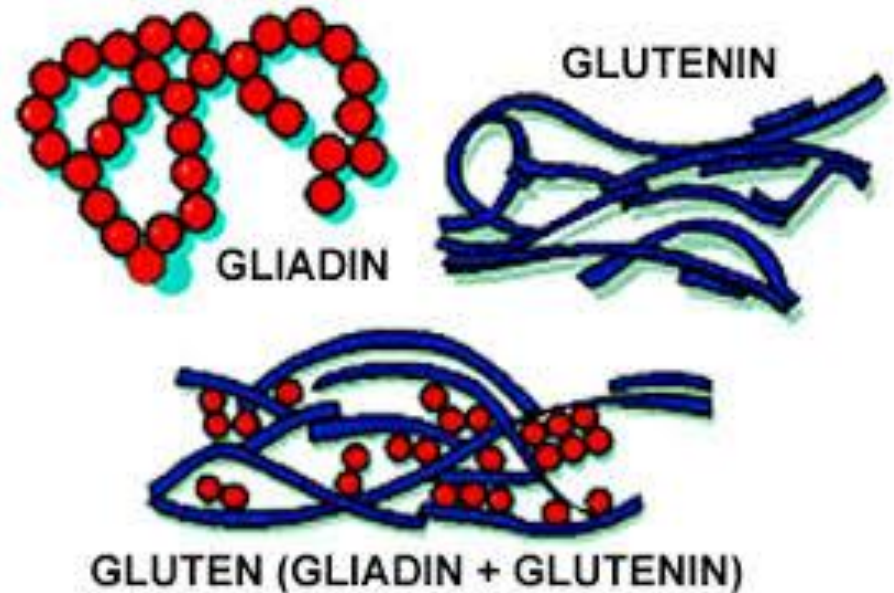
Water activates **GLIADIN** & **GLUTENIN** in the flour which absorb the water to form **GLUTEN**

KNEADING stretches the **GLUTEN** and it forms an elastic network

GLUTEN adds **STRUCTURE** to bread or **ELASTICITY** to pasta

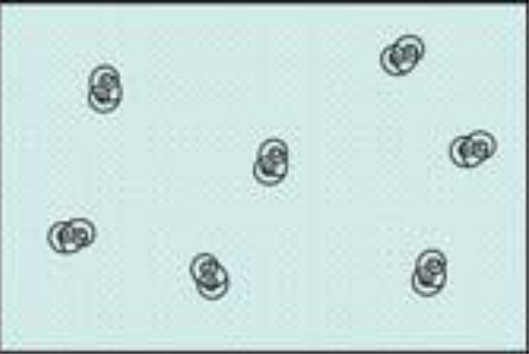
COELIACS are intolerant or allergic to **GLUTEN**

GLUTEN FORMATION

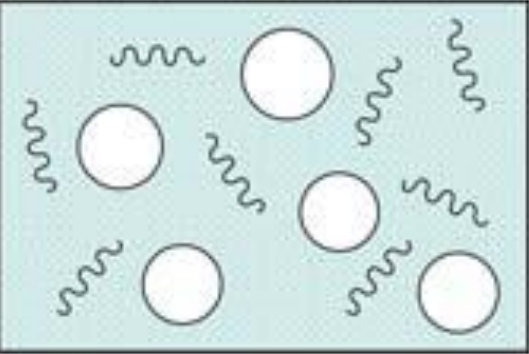


PROTEIN

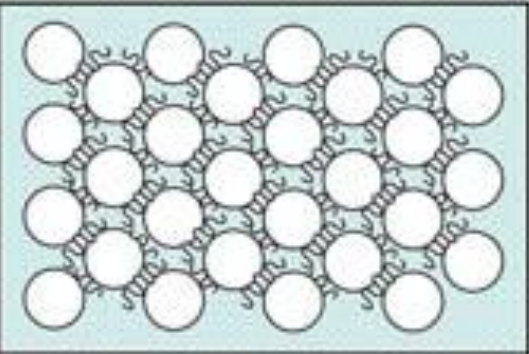
FOAM FORMATION



RAW EGG WHITE:
90% water and almost
10% protein



WHEN WHIPPED A LITTLE:
large air bubbles are mixed
into the egg white and the
proteins are denatured



WHEN FOAM IS COMPLETE:
denatured proteins are
oriented around smaller air
bubbles

A Dash of Science.com



GAS-in-LIQUID FOAM



Egg whites
DENATURE
through
WHISKING,
trapping air
which is
locked in by
the **PROTEIN**
when cooked

**FUNCTION & CHEMICAL
PROPERTIES**

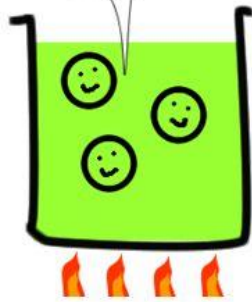
CARBOHYDRATE

CARBOHYDRATE

GELATINISATION

Heat
starch
granules
in liquid

Getting warm



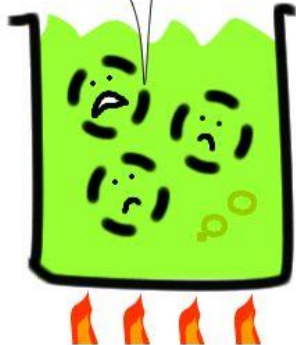
Starch
granules
become
swollen

I'm swelling up



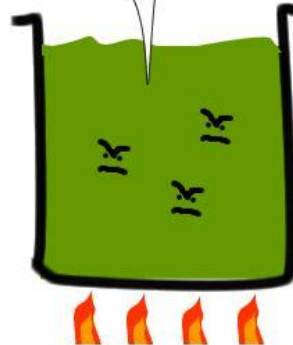
Starch
granules
burst

I'm Bursting!!



The liquid
thickens
and
gelatinises

Didn't we do well



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

The process in which **MOIST HEAT** is applied to **STARCH** grains, which **SWELL** and break open to release **AMYLOSE**

AMYLOSE
thickens the liquid

STARCHY RICH
ingredients can be
used to **THICKEN**
SAUCES, GRAVY,
SOUPS

Examples are:
Cornflour
Arrowroot
Potatoes
Rice

CARBOHYDRATE

DEXTRINISATION

When **DRY** heat is applied to **STARCH** sugars called **DEXTRINS** are formed and causes them to turn **BROWN**

**BAKING, GRILLING
OR TOASTING**

If over heated the starch turns to **ACRYLAMIDE** which can be harmful



ACRYLAMIDE is a chemical substance formed when starchy foods, such as potatoes and bread, are cooked at high temperatures (above 120°C).



CARBOHYDRATE

CARAMELISATION



EXAMPLES:

- Toffee
- Fudge
- Jam
- Honeycomb
- Onions
- Crème Caramel
- Bananas
- Crème Brulee
- Brandy snaps
- Spun sugar

CARAMELISATION occurs when **SUGAR** comes into contact with **HEAT** about 180°C. The water in the sugar **EVAPORATES**, and it darkens and **THICKENS**.

Caramelisation is a form of non-enzymatic browning.

AFFECTS COLOUR & FLAVOUR



CARBOHYDRATE

MAILLARD REACTION



The **MAILLARD REACTION** is a chemical reaction between **AMINO ACIDS** and reducing sugars in **STARCH** that gives browned food its distinctive **TOASTED** flavour.

EXAMPLES:

- Seared steaks,
- Toast,
- Cookies & biscuits,
- Breads,
- the colour of beer, chocolate, coffee, and maple syrup.
- The colour of dried or condensed milk.

Like caramelization, it is a form of non-enzymatic browning.

AFFECTS COLOUR & FLAVOUR

FUNCTION & CHEMICAL PROPERTIES

FATS & OILS

FATS & OILS

SHORTENING

SHORTENING occurs when the **FAT** surrounds the **FLOUR PARTICLES** preventing **GLUTEN** from forming by creating a **WATERPROOF BARRIER**.

Too much Gluten Forming would make the pastry or biscuits chewy instead of **CRUMBLY**

The '**SHORTNESS**' or crumbliness of pastry is determined by the extent to which **GLUTEN MOLECULES** are allowed to form in the dough.



USES THE RUBBING IN METHOD



FATS & OILS

AERATION

AERATION is when **AIR** is trapped in a mixture



If **SUGAR** is added, this helps the mixture to form a stable mixture of sugar crystals, fat, and air.

CREAMING is not just about mixing ingredients together, it is also about **GETTING AIR INTO THEM.**

The process of creaming repeatedly splits apart and then presses together the **FAT** molecules and at the same time **TRAPS** tiny **AIR POCKETS** in the mixture.



Saturated fats are much better at being aerated than unsaturated oil

AERATION IS CREATED THROUGH CREAMING METHOD, SIEVING & WHISKING.

FATS & OILS

PLASTICITY

PLASTICITY

affects the
**SPREADING,
CREAMING &
SHORTENING**
ability of FAT



PLASTICITY is the ability of **SOLID FAT** to soften over a **RANGE** of **TEMPERATURES**

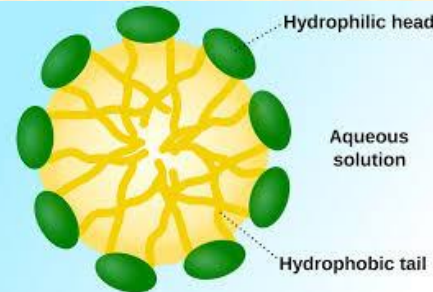
FATS can be processed to change their chemical structure and alter their melting point. An example of this is **MARGARINE & SPREADABLE CHEESE**



FATS & OILS

EMULSIFICATION

LECITHIN
is an emulsifier
Found in egg
yolk



An emulsifier is a molecule with a water loving part & a water repellent part

PLASTICITY is the ability of **SOLID FAT** to soften over a **RANGE** of **TEMPERATURES**

An **EMULSION** can be defined as a mixture of **OILY AND WATERY LIQUIDS**. To make an emulsion you need an **EMULSIFIER** and **FORCE** such as whisking and beating to break the oil droplets apart so they mix with the watery liquid.



FUNCTION & CHEMICAL PROPERTIES

RAISING AGENTS

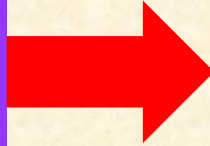
RAISING AGENTS

CHEMICAL

Produce **CARBON DIOXIDE** when heated with a liquid

BAKING POWDER

Reacts to moisture & heat to produce **CARBON DIOXIDE**

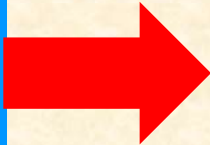


CAKES



BICARBONATE OF SODA

Needs moisture & acid (yoghurt or milk) to produces **CARBON DIOXIDE**

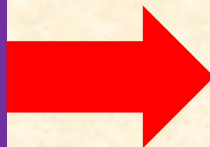


**BISCUITS
SODA BREAD
STRONG FLAVOUR
CAKES**



CREAM OF TARTAR

It's an powder acidic substance similar to lemon or vinegar.



**STABLE
SMOOTH
MERINGUES**



RAISING AGENTS

AIR & STEAM

MECHANICAL
RAISING
AGENTS ARE
AIR & STEAM

AIR

Whisked sponge



meringue



batter



cakes & scones



STEAM

choux pastry



Yorkshire puds



flaky pastry

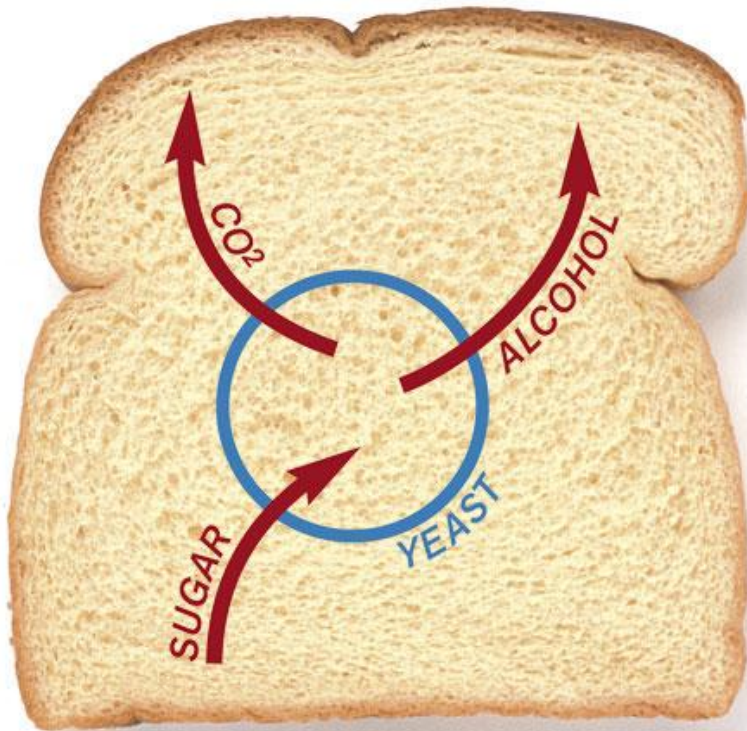


WHISKING, BEATING, FOLDING, SIEVING, CREAMING, RUBBING IN

RAISING AGENTS

BIOLOGICAL

YEAST is a
BIOLOGICAL
RAISING
AGENT



YEAST IS A SINGLE-CELL PLANT
FUNGUS used in bread, beer & doughnuts

YEAST needs WARMTH (25-29°C)
FOOD (sugar) and LIQUID (water
or milk) to FERMENT where it
produces CARBON DIOXIDE
whilst proving.

GLUTEN locks around the CO2
bubbles to give a light and airy,
well risen structure to bread.

