

Starter:

1. Define protein denaturation [1 mark]
2. Define protein coagulation [1 mark]
3. Define syneresis and indicate when it takes place. [2 marks]
4. Describe how foams are formed [2 marks]
5. Explain why corn starch cannot be used instead of strong flour in bread production [2 marks]

Revision- Food Science- Proteins

Learning Objectives:

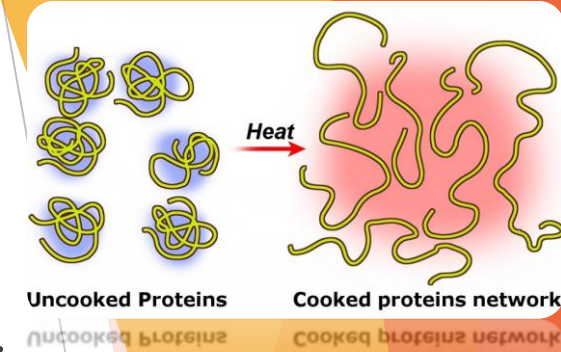
Recall information about proteins

Address any misconceptions

Apply knowledge to exam questions

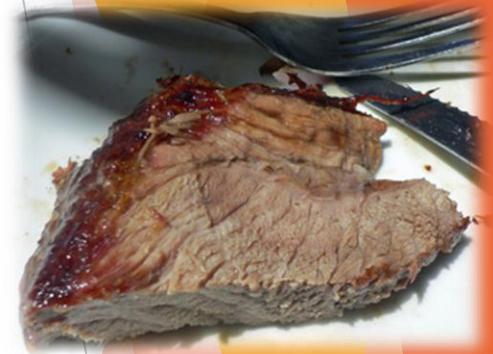
In depth look- Protein Denaturation

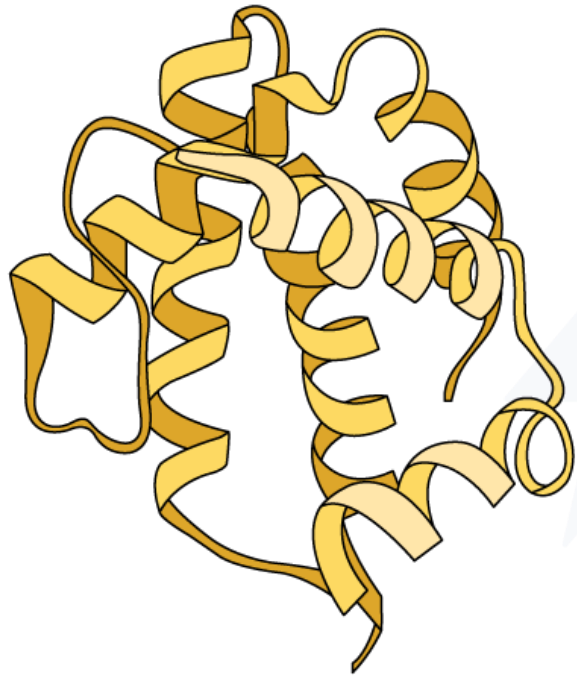
- ▶ Definition= Denaturation is the change in structure of protein molecules. Long chains of coiled amino acids unravel and are then set in a new form (coagulation).
- ▶ Proteins can be denatured by=
 - Acids (marinating and curdling)
 - Mechanical action (whisking egg whites)
 - Heat (cooking a quiche)
- ▶ Marinating→ highly seasoned liquid, tenderise tougher cuts of meat, acid allows meat fibres to breakdown= juicy and tender food
- ▶ Curdling→ think back to making cheese, curds attracted to each other and become lumpy= curds pressed into cheese



In depth look- Protein Coagulation

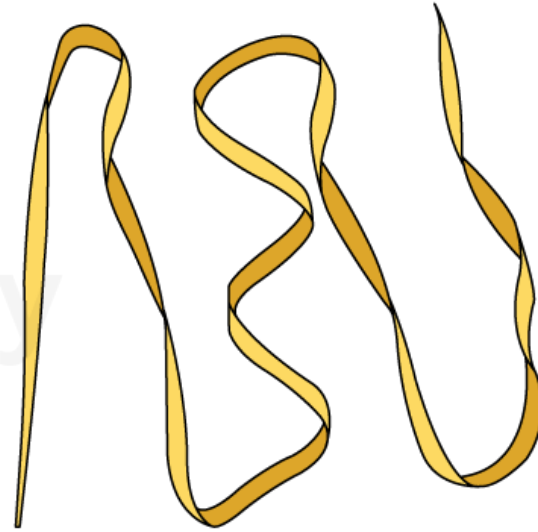
- ▶ Definition= the setting of a protein brought about by heat and acids- this change is irreversible (can't go back to original form)
- ▶ If protein heated too much= hard, tough and difficult to digest (well done steak)
- ▶ Definition- SYNERESIS= usually refers to eggs if overcooked- proteins shrink as they coagulate and separate from the watery liquid
- ▶ Explain what effect heat has on the following foods-
 - ▶ Meat and poultry, fish, eggs, wheat, milk, cheese





NORMAL PROTEIN

DENATURATION →



DENATURATED PROTEIN

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In depth look- Gluten formation

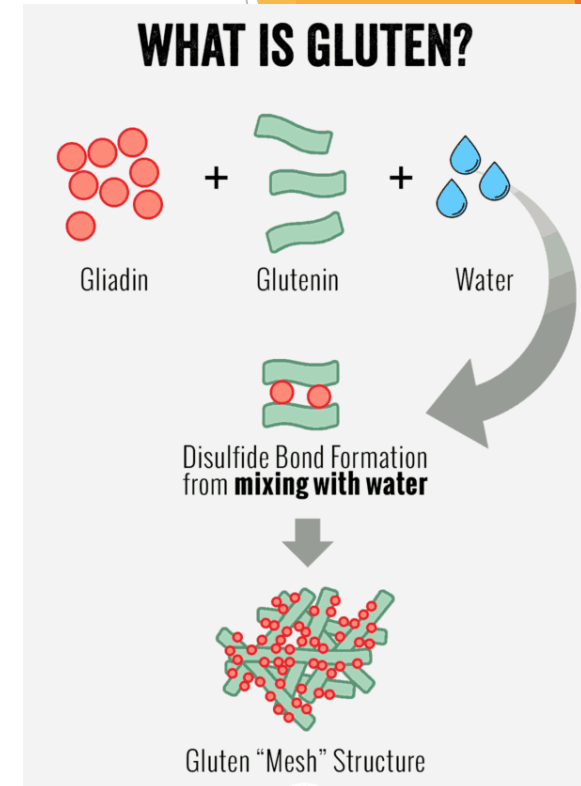
- ▶ Gluten= gliadin + glutenin (two different protein)
- ▶ Gliadin= sticky mass
- ▶ Glutenin= gives strength and elasticity to dough

- ▶ Water activates gluten→

kneading builds up gluten (framework for bread)→

yeast releases CO_2 (trapped by gluten)→

gluten (protein) sets in oven= coagulation



In depth look- Foam formation

- ▶ Definition= A foam is when a gas is spread throughout a liquid to produce a gas-in liquid foam.
- ▶ E.g. Eggs→ Whisking (mechanical denaturing) allows tiny bubbles or air to be incorporated to the egg white (this is reversible as it can collapse)

When heat is applied it will coagulate and set (meringue)

Plenary- Exam question

Discuss why acids are used in meat marinades [4 marks]

Identify three gluten-containing cereals [3 marks]

Name one type of pastry which is made in a way that prevents gluten formation [1 marks]

Mark Scheme

Any four from:

- Acids denature the proteins in meat.
- Acids make the meat softer.
- Acids make the meat more tender.
- Acids improve the flavour of the meat.
- Acids enable the flavour to penetrate the meat, so not only the surface is flavoured.
- Acids help to keep the meat moist and juicy.
- Acids make the meat tastier.
- Acids make the meat easier to chew.
- Acids make the meat easier to digest.

Accept any other suitable answer.

(1 mark for each correct, max. 4 marks)

Any three from: wheat, spelt, rye, barley, uncertified oats, triticale.

Accept other suitable answers. Accept 'non-certified oats'.

Do NOT accept 'oats' or 'certified oats' as oat is naturally gluten-free.

(1 mark for all correct, max. 1 mark)

Shortcrust, puff pastry, rough puff, or any other suitable answer.

(1 mark)