

# **STEM in Food Science in Technology and Living**

**Proteins**

# Egg : texture changes during heating

- Heat causes egg whites and yolks become hard and firm
- Egg white : starts coagulation at around 60°C and is completely coagulated at 65-70°C
- Egg yolk : coagulates within 62°C – 70°C
- Egg can be cooked at 61°C for an hour and still has a soft yolk
- Beaten egg coagulates at a slightly higher temperature (69°C)



Egg white coagulates first

# Food experiment: Boiling of eggs

Temperature of water from 25°C reaching ~80°C	Temperature of water from 25°C reaching ~90°C	~ 100°C water for 2 mins	~ 100°C water for 5 mins	~ 100°C water for 6 mins	~ 100°C water for 7 mins	~ 100°C water for 15 mins
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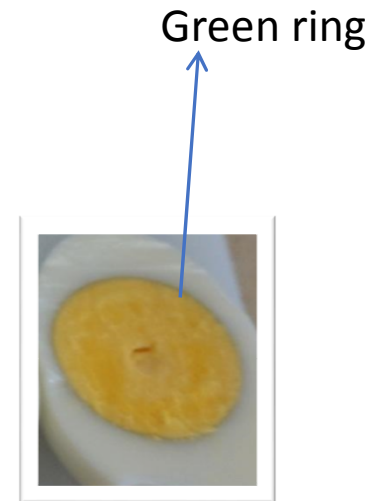
# Egg : texture changes during heating

- Heating eggs at high temperature for a long period can diminish their texture, flavour and colour
- Overcooked egg becomes tough, rubbery and shrink because of dehydration
- The key factors in cooking eggs are temperature and cooking time



# Egg : colour changes during heating

- Eggs become opaque due to coagulation of protein
- Sometimes, slight browning in eggs because of Maillard reaction
- Undesirable colour changes are found when eggs are overcooked
  - sulphur in egg white may combine with iron in yolk to form ferrous sulphide, a green coloured compound with strong odour and flavour of a “green yolk”
- cool hard boiled eggs quickly in cold water or cook in stainless steel equipment with low cooking temperature can prevent changes in colour



Normal egg yolk



Green egg yolk

# Related Food Tests

Food Test Number	Food Test
Food Test 3	Making of marshmallow
Food Test 4	Factors affecting egg coagulation
Food Test 5	Effects of heating temperature on egg doneness