Eggs are one of the most versatile kitchen ingredients; there are numerous ways of cooking them on their own, and they can also be used to help create a range of other foods. Here, we take a look at what they’re made of, and how they change during cooking.

### Egg Colour & Composition
The yellow colour of egg yolks is due to the presence of the carotenoid pigments lutein and zeaxanthin. Artificial additives aren’t permitted, but additives such as beta-carotene and marigold petals can be added to chicken feed to influence the yolk’s colour.

### Egg Shell Composition
Calcium carbonate is the main component of eggshells. Nanoparticles of calcium carbonate are arranged into ordered crystals by proteins, forming a calcite shell. The colour of the eggshell comes from porphyrin pigments on the shell’s surface.

### Egg White Proteins
About 90% of the egg white is water; the rest of its mass is mostly protein. Ovalbumin’s purpose is thought to be nutrition for the developing chick; Ovomucin helps thicken the egg white; and conalbumin binds iron & guards against infection.

### Cooking Eggs
Egg proteins begin in the raw egg as folded chains, but as they are heated they begin to denature and unfold. Interactions between the unfolded proteins create a three-dimensional network, trapping the water and causing the egg to solidify.

- **Hydrogen Sulfide**: Formed by the reaction of sulfur-containing proteins in the albumen, it is the compound that gives cooked eggs their characteristic smell. When eggs are cooked for a long time it can react with iron in the yolk, forming iron sulfide, and giving a green hue to the yolk surface.

- **Protoporphyrin IX**: Brown pigment; the presence of the pigment oocyanin causes eggs to have a blue or green colouration.

- **Calcium Carbonate**

- **Iron (II) Sulfide**

- **Albumen pH**
  - Freshly laid egg: 7.6
  - After several days of storage: 9.2

Albumen pH increases as CO₂ diffuses out through the shell. Albumen adheres more strongly to the shell at lower pH, making it harder to peel boiled eggs.