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**

Ovalbumin: 54%
Conalbumin: 12%
Ovomucin: 2%
Others: 32%

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.

Calcium carbonate: \( \text{Ca}^{2+} \cdot \text{O} \cdot \text{O}^- \)

**Protoporphyrin IX**

Brown pigment; the presence of the pigment oocyanin causes eggs to have a blue or green colouration.

**Albumen pH**

**OF FRESHLY LAID EGG**

7.6

**AFTER SEVERAL DAYS OF STORAGE**

9.2

Albumen pH increases as CO\(_2\) diffuses out through the shell. Albumen adheres more strongly to the shell at lower pH, making it harder to peel boiled eggs.