



## Lecture title: Structure of Egg

**Lecturer Affiliation: Lecturer, Yaman Saad Fadhil**

**Department of Public Health, College of Veterinary Medicine, University of Mosul, Mosul, Iraq. <https://orcid.org/my-orcid?orcid=0000-0001-6373-0332>**

### Summary:

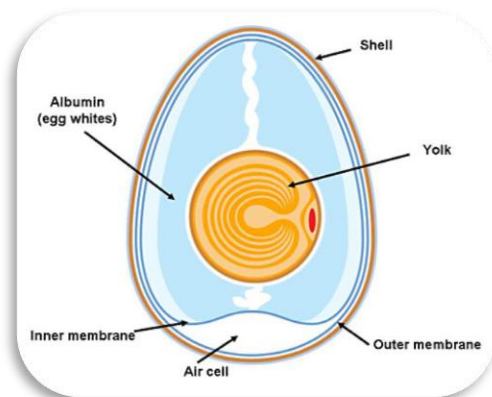
#### ➤ Terms :

- **Cuticle** : the moist protective coating on a freshly laid eggs that partially seals the pores of the egg shell to prevent penetration by bacteria.
- **Pure-bred** : offspring from a hen and rooster of the same breed.
- **Hybrid** : offspring of parents from different breeds (also referred to as **cross-bred**); the artificial crossing of two different species.
- **Brooder** : a device used to provide warmth to young chicks.
- **Coop** : the house or cage in which poultry are housed.

#### ➤ Structure of Egg

##### ➤ The egg consists of :-

- yolk.
- albumen or egg white.
- shell membrane.
- shell.



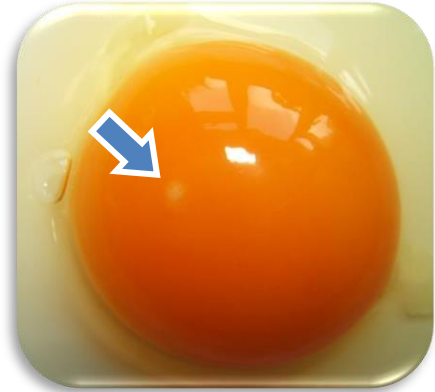
##### ➤ Yolk :

- A rounded yellowish colored material is present at the center of egg, it is called **egg yolk** and is enclosed by a thin membrane called **vitelline membrane** which is colorless.
- It accounts for about 31% of the total egg weight.
- **Pigmentation** of the yolk affects the **acceptability of the egg**.
- **Rations** determine the **color of the yolks**.



➤ **Germinal Disk:**

- A small, circular, white spot (3-4mm) on the surface of the yolk, **it's where the sperm enters the yolk**, and it's called **blastoderm** in fertile egg and **blastodisc** in infertile egg.

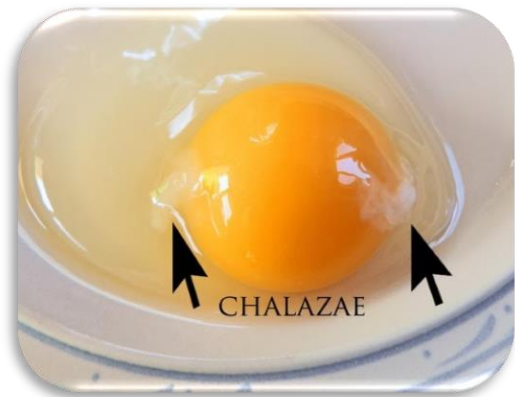


➤ **Albumen or Egg White:**

- The albumen accounts for about 58% of the total egg weight.
- The albumen consists of four layers:
  - **outer thin and thick white.**
  - **inner thick and thin white.**
- The inner thick white layer of albumen is also known as (**chalaziferous layer**).

➤ **Chalazae:**

- Two thick spiral band are emerged from **chalaziferous layer**. They are **joining the yolk to the ends of the shell to hold the yolk in the centre of the egg**.
- Prominent chalazae **indicate high quality egg** (fresher the egg).



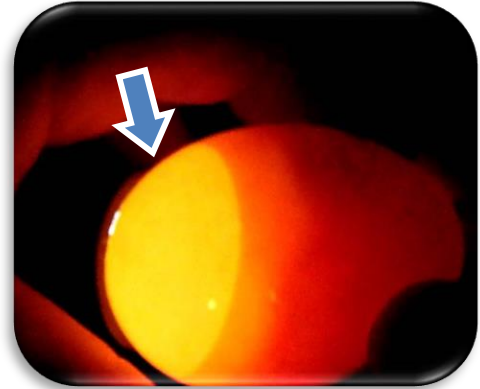
➤ **3) Shell Membrane**

- two shell membranes **outer shell membrane** and **inner shell membrane**.
- They form a protective barrier against bacteria.
- The **shell** and **shell membranes** constitute about 11 % of total egg weight.
- Both shell membranes are attached firmly to each other throughout the egg except at the broader end of egg where **air space** or **air cell** is formed in between the two shell membranes



➤ **Air Cell:**

- It is the **pocket of air formed at the large end of the egg**. This is caused by the contraction of the contents on cooling after the egg is laid.
- The air cell increases with the age of the egg as there is considerable amount of moisture loss.



➤ **Egg Shell:**

- It is the outer covering of the egg is composed of calcium carbonate  $\text{CaCO}_3$  (94%), and the remaining percentage distributed between protein and minerals.
- The egg shell is covered with as many as 1700-7500 tiny **Pores** on it, which **helps in gaseous exchange required for embryo development**.
- The shell is covered by a thin transparent protein coating, called **cuticle**, **It gives natural protection to the shell pores**.



➤ **Gross parts of egg of various poultry species**

➤ Species	➤ Egg weight (g)	➤ Yolk (%)	➤ Albumen (%)	➤ Shell & shell membranes (%)
➤ Chicken	➤ 58	➤ 31	➤ 58	➤ 11
➤ Duck	➤ 70	➤ 35	➤ 53	➤ 12
➤ Quail	➤ 10	➤ 32	➤ 48	➤ 20
➤ Turkey	➤ 85	➤ 32	➤ 56	➤ 12



### EGG YOLK



#### Per 100g serve (raw weight)

Calories: 313kcal  
Protein: 15.6g  
Total Fat: 28.2g  
Saturated Fat: 8.6g  
Cholesterol: 1050mg  
Selenium: 56ug  
Folate: 120ug  
Vitamin B12: 4ug

### EGG WHITE



#### Per 100g serve (raw weight)

Calories: 47kcal  
Protein: 11.2g  
Total Fat: 0g  
Saturated Fat: 0g  
Cholesterol: 0mg  
Selenium: 11ug  
Folate: 7ug  
Vitamin B12: 0ug

- The whole egg is a source of **high-quality protein** (i.e., proteins that contain all the amino acids needed in the human diet).
- In addition, it is an excellent source of all **vitamins** (except vitamin C) and contains many essential minerals, including phosphorus and zinc.
- All the **fats** or **lipids**, as well as the **cholesterol** are found in the yolk. Yolk lipids are high in unsaturated fatty acids, with the ratio of unsaturated to saturated fatty acids commonly being 2 to 1.