



Evaluation of Egg Quality in Poultry

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Abstract: This article presents the literature data on the quality indicators of eggs of chickens of the poultry farm and home conditions of egg, meat-egg direction.

Keywords: poultry, egg, protein, yolk, pod, diameter, barbell, index, ovoscope and incubator.

Relevance of the topic. In order to further develop and comprehensively support poultry farming in the republic, introduce advanced technologies and innovative developments in the sector, deepen the processing of poultry products, expand their types and the scope of export, the President of the Republic of Uzbekistan dated 13th of 2018 In November, the decision No. PQ-4015 "Additional measures for the further development of poultry farming" was adopted, and the priority tasks of further development of poultry farming were defined in the decision [1].

In the republic, the volume of production carried out in recent years for the development of poultry farming and the wide introduction of intensive technology to production has increased significantly, and the price stability of poultry products is being ensured in the domestic consumer markets.

The development of poultry farming is of particular importance in the sustainable provision of food security. Poultry farming is one of the fastest growing branches of animal husbandry, which provides the population with dietary meat and egg products. It is not for nothing that they say that poultry farming is one of the seven treasures [2].

Level of study of the problem. The quality of eggs is evaluated by complex signs. The most important of these signs are: egg weight, shape, ratio of its constituent parts, height of protein and yolk, shell thickness and ripeness. The following methods are used to determine the quality of eggs: examination of the appearance, weighing, measuring the size, illumination with a light source (ovoscope) and opening the egg [3].

When looking at the external appearance of the egg, its shape and the condition of the shell are important. It is defined by the shape of the egg, its size, the mutual ratio of its diameters or its index expressed in %. A regular-shaped egg is oblong, the ratio of the large and small radii of the circle is 1.32, and the shape index is 76%. The ratio of the diameters of an extremely elongated egg is equal to 2, and the shape index is close to 50%. The ratio of diameters of circular eggs is close to 1, and the shape index is close to 50%. To determine the ratio of the circumference meters, the large and small diameters of the egg are measured with a caliper and their ratio is calculated [3].

To determine the index of the shape of the egg, a special instrument-indexometer IM — 1 is used.

The egg to be studied is placed on the work platform - the tray of the tool, and clamped to the stationary support part of the tool. The diametrical area of the egg should touch one of the stationary supports and be perpendicular to the other. Holding the egg against the stationary support with one hand, the moving supports of the instruments are touched with the other hand and the index readings are determined. If necessary, it is possible to measure the large and small diameters of the egg with indicators located near the mobile supports of this device.

The shell of the egg is clean and smooth, not shriveled, without growths and pits. The clear color of the shell indicates that the mucous membrane is intact and the egg is relatively fresh. An egg with an irregular shape, a damaged or dirty shell, and two yolks is not suitable for hatching in an incubator. The above-mentioned defects are not only unsuitable for incubation, but also deteriorate the quality of the product when consumed as food. For this reason, poultry farms try to breed eggs with the same shape and shell color, clean surface, flat and unbroken eggs [3].

Egg weight is determined by weighing on VLTK-500 type scales with an accuracy of 0.1 g. For incubation, eggs of a weight characteristic of the type, breed or line of the bird are selected. Small and excessively large eggs are not suitable for incubation. Hatchable eggs can vary in weight depending on the purpose of hatching chicks.

Eggs are illuminated with a light source (ovoscope) and defects that are not visible to the naked eye are detected in their pods. The pointed part of the egg is held by hand, and the blunt side is held to the light source. In this case An indicator describing the quality of an egg shell is its marbling. When the egg shell is illuminated, it is seen that the dark and light parts are located one after the other on its surface. This is the result of uneven distribution of organic matter in the egg shell. These parts of the egg shell have different humidity and give different shade. Eggs with a marble shell also indicate that they are unsuitable for incubation. When viewed through an ovoscope, an air gap is usually visible at the end of the egg in the form of a round dark spot. If it is in the middle or third part of the egg, such eggs are considered defective and are not suitable for incubation [3].

Another common defect in eggs is the rise of the air space under the shell, which causes the egg to spin when you turn it. This score occurs as a result of damage to the subcapsular and protein membranes [4].

The size of the air space (diameter and height) depends on the storage period of the egg, and the newly hatched egg does not have an air space. During egg storage, the air space increases as a result of the evaporation of the substances inside it. In a fresh egg, its height is 3 mm and its diameter is 17 mm. In eggs stored for more than two weeks, the height of the air space increases to 7 mm and the diameter increases to 25-30 mm. It is possible to draw the border of the air space with a pencil when viewed through the ovoscope, and measure its height and diameter with a caliper.

The height of the air gap can be determined by reaching the limit of the central axis of the barbell circle, and keeping the edge of the barbell circle at the center level. The height and diameter of the air gap can be determined using a special stencil made of millimeter paper glued to the cardboard [3].

The egg yolk is located in its center, and when illuminated by a light source, it appears as a black spot. The color of the egg yolk is usually explained by the presence of carotenoids, which increase the biological value of the eggs. When the egg turns 180° and its position sharply, the yolk after a few vibrations restores its position in the center of the egg, which indicates the integrity of its ligaments. If one of the ligaments is broken, the egg yolk vibrates a lot and does not return to the center, it is moved in the opposite direction from the broken ligament [3].

Yolk movement indicates low protein density and poor egg quality. Other defects of the egg may also be known when viewed with an ovoscope. For example, as a result of long-term storage or improper handling of eggs, the maturity of the egg yolk membrane is damaged, and the yolk and protein are mixed. In some cases, black spots appear on the eggs - clusters of microorganisms developed due to the strong contamination of the shell and storage in humid conditions. If the egg is

completely infected with microorganisms and the contents are not illuminated, such eggs are called tumok. Eggs with embryos that die in the initial period of development are called blood eggs [5].

When fresh eggs are exposed to high-temperature air for a long time, the development of mold continues, and then when placed in a cool room, the mold dies within a few days and forms a bloody mass [3].

The density of eggs is determined by placing them in a solution of table salt with different densities (from 1.050 to 1.090 g/cm²). In this case, table salt solutions that differ from each other by 0.005 g/cm² are prepared. If an egg placed in a container with this solution floats to the surface of the solution, the density of the egg is less than the density of the solution, if the egg sinks to the bottom of the solution, its density is greater than the density of the solution. If the egg is half submerged on the surface of the solution, the density of the egg is equal to the density of the solution. The density of the egg describes its freshness and the thickness of the shell. Whole value fresh eggs have a density of 1.075-1.085 g/s m². The density of continuously stored eggs is less than 1/cm² [3].

Opening the inside of the egg. Before opening the inside of the egg, it is placed in a horizontal position for a few minutes so that the yolk rises above the egg. Then carefully pierce the center of the egg with these scissors without tearing the yolk membrane. Then, with these scissors, a hole with a diameter of 15-20 mm is made, and through a strong light, the ring of the fungus on the egg yolk is found. Depending on its condition, it is determined whether the egg is fertilized. Fertilized egg has a compact ring of different colors with a diameter of 4-5 mm. The diameter of the umbilical cord in an unfertilized egg is 2-3 mm, and the umbilical cord is not compacted.

After determining that the egg has been fertilized, the opening in the pod is expanded. When doing this work, it is necessary to ensure that the cut parts of the shell are flat, because when removing the yolk, its membrane should not be allowed to crack.

When the pod is cut, its crushed parts are not thrown away, as this is needed to measure the total weight of the pod [3].

The contents of the egg are placed on the surface of the piece of glass. It is convenient to use organic glass for this purpose. Depending on the condition of the contents of the egg placed on the surface of the piece of glass, it is possible to think about its full value.

If the contents of the egg are spread over a large surface, the boundary between liquid and dense proteins is added, and the yolk is spread, such an egg cannot be full of value. If the protein and yolk occupy a small surface, the dense protein border is intact, the egg shape is preserved, and the yolk resembles a sphere, then such an egg is considered full of value [3].

An objective indicator of egg quality is the height of its dense protein layer and yolk. These are measured using a micrometer. The micrometer is mounted on a table with a controlled surface level. A smooth, clean glass is placed on the surface of the table, an egg is placed on it and measured at a distance of 10 mm from the upper point of the egg yolk, from the edge of the layer of dense protein.

Measuring the egg placed on the surface of the glass should be done quickly. In this case, the large and small diameters of the protein and egg yolk are measured with a caliper. Protein and egg yolk indices are determined according to the following formula:

$$\frac{h}{(D+d):2}$$

where: *h* is the height of the protein or egg yolk,

D is the size of the protein or yolk;

d is the small diameter of protein or egg yolk.

The height of dense protein depends on the size of the egg. Therefore, a special table was created to compare the protein quality of eggs of different sizes with this important indicator, which depends on

the weight of the egg and the height of the protein. The quality of the protein expressed in the unit of X is determined [3].

The greater the height of the protein and the smaller the weight of the egg, the greater the unit of protein and the higher the quality of the egg protein.

The protein, yolk and yolk that make up the composition of the egg perform several important tasks in the development of the embryo and are explained by the fact that it consists of various chemical and basic nutrients. Therefore, the quality of the egg depends on the ratio of its components and the total weight of the egg. To determine the weight of the parts that make up the egg, they are cleaned of protein residues, pieces broken during egg cracking are collected and measured together with the membranes under the shell. The egg yolk is separated from the protein and its weight is determined. Egg protein is not measured, because it is natural that some of it is lost during the work process. Therefore, its weight is equal to the subtraction of the weight of the shell, yolk, and curtains from the weight of the whole egg [3].

The relative weight of the egg components and the total weight of the egg (about 58 g) are given in Table 1.

Table 1 The proportion of parts that make up the composition of chicken eggs, %

The parts that make up the composition of the egg	Average indicator	The border
In relation to the weight of the egg:		
pod	12,0	7,8-13,6
yellow	32,0	24,0-35,5
protein	56,0	53,1-68,9
Relative to total protein weight:		
external liquid protein	23,0	10-60
outer dense protein	57,0	30-80
internal liquid protein	17,0	1-40
inner dense protein	2,0	-
Links:		
the older one	0,8	-
the younger one	0,2	-

One of the important quality indicators of hatchable eggs is the shell thickness. The thickness of the egg shell is determined using a micrometer.

Since the thickness of the egg shell becomes thinner in three parts along the direction of the bottom, it is appropriate to measure the thickness of the shell in three parts: at the ends of the tip and bottom, as well as in its middle part. The thickness of the egg shell depends on the type and age of the bird. The thickness of a chicken eggshell is 0.29-0.34 mm in three parts and 0.28-0.31 mm at the end. Based on scientific research and practical experience, the requirements for hatchable eggs were developed (Table 2).

Table 2 Requirements for hatchable eggs

Indicators	Measure unit	Breed of chickens	
		Egg in the direction of	In the direction of meat and meat-eggs
Egg weight of 12-month-old hens	g	54	54
Egg weight of chickens up to 12 months old:			
When used in breeding	g	52	52
When used in industry	g	50	52
Air gap diameter	mm	18	18
In 1 g of egg yolk:			

vitamin A	mkg	6	6
carotenoids	mkg	18	18
vitamin B2	mkg	4	4
Fertilization of eggs	%	92	90
Emergence of healthy chicks	%	76	70
Egg density index	g/sm ³	1,32-1,36	1,32-1,36
Protein index	g/sm ³	1,075	1,075
		0,07	0,07

Summary. The development of poultry farming in our country with the proper use of the wide opportunities for poultry farming in our country, the importance of chickens in agriculture, increasing their productivity, the right way to feed and store chickens in the direction of eggs and meat-eggs. we get more eggs from egg and meat-egg hens.

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