

Article

Veterinary-Sanitary Laboratory Assessment of Poultry Eggs Using Laboratory Methods

Dildora Nasimova¹, Ibragimov Furqat Buriyevich², Shodiqulova Madina O'Imasbekovna³, Ahadov Akobir Husniddin ugli⁴

1,2,3,4. Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology

*Correspondence: nasimova6446@gmail.com¹, fibragimov@ssuv.uz², Shodiqulovamadina70@gmail.com³, ahadovakobir97@gmail.com⁴

Citation: Nasimova D., Buriyevich I. F., O'Imasbekovna S. M., Husniddin ugli A. A. Veterinary-Sanitary Laboratory Assessment of Poultry Eggs Using Laboratory Methods. American Journal Of Botany And Bioengineering 2026, 3(5), 32-35.

Received: 10th Feb 2026

Revised: 11th Mar 2026

Accepted: 21th Apr 2026

Published: 26th May 2026



Copyright: © 2026 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>)

Abstract: This study presents a veterinary-sanitary laboratory assessment of poultry eggs using ovoscopic and saline flotation methods. The research was conducted on egg samples collected from Siyob Market, Damariq Market, and Railway Station Market. A total of 30 eggs (10 from each location) were analyzed. The ovoscopic method was applied to evaluate the condition of the air chamber, yolk position, and albumen quality, while the saline solution method was used to determine egg freshness and suitability. The obtained results were presented in tabular form, and overall conclusions were drawn regarding the veterinary-sanitary quality of the sampled eggs.

Keywords: Poultry eggs, veterinary-sanitary examination, ovoscopy, air chamber, saline flotation method, food safety.

Introduction

Poultry eggs represent one of the most biologically complete and economically significant animal-derived food products in the human diet, owing to their balanced composition of proteins, lipids, vitamins, and essential microelements. Their widespread consumption across diverse populations is attributed not only to their high nutritional density but also to their versatility in culinary and industrial applications. Nevertheless, despite these advantages, eggs are highly perishable biological structures that are susceptible to both external contamination and internal quality deterioration under improper storage, transportation, and handling conditions [1-5].

From a veterinary-sanitary perspective, poultry eggs are considered potential carriers of microbial contamination, including pathogenic bacteria capable of causing foodborne infections in humans. Structural integrity of the shell, freshness indicators such as air chamber size, albumen viscosity, and yolk stability, as well as storage temperature and environmental hygiene, play a decisive role in determining the safety and suitability of eggs for consumption. Consequently, even minor deviations in these parameters may significantly reduce egg quality and increase public health risks

[6]. In this context, systematic veterinary-sanitary laboratory examination becomes essential for objective quality assessment of eggs entering retail markets. Laboratory-based diagnostic approaches, including ovoscopic analysis and saline flotation methods, provide reliable and rapid means of evaluating internal and external egg quality characteristics without destructive testing. These methods enable the detection of freshness levels, hidden defects, and potential spoilage, thereby ensuring compliance with food safety standards. Therefore, this study focuses on the veterinary-sanitary laboratory assessment of poultry eggs collected from selected markets using ovoscopic and saline solution methods, with the aim of determining their quality status and suitability for human consumption under practical market conditions [7][8].

Materials and Methods

Study Area and Samples

The study was conducted in the laboratory of the Department of Veterinary-Sanitary Examination at Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology [9].

Egg samples were collected from three different markets:

- Siyob Farmers Market
- Damariq Farmers Market
- Railway Station Farmers Market

A total of **30 eggs** were examined, with **10 eggs from each market**.

2.2 Study Subject

The study focused on evaluating the veterinary-sanitary condition of poultry eggs, particularly their suitability for human consumption (fresh, conditionally suitable, or unsuitable) [10].

Methods of Examination

Ovoscopic Examination

Ovoscropy is a non-destructive method used to assess the internal structure of eggs.

Procedure:

- The egg is placed on the ovoscope device.
- The internal structure is examined under transmitted light.
- The position and size of the air chamber are evaluated.
- The condition of yolk and albumen is observed [11].

Evaluation criteria:

- Small air chamber located at the blunt end → **Fresh and suitable egg**
- Enlarged or displaced air chamber → **Conditionally suitable or questionable egg**
- Presence of dark spots or abnormalities → **Unsuitable egg**

Fresh eggs typically have an air chamber of **3–4 mm**. According to standard requirements, it should not exceed **13 mm**. Eggs with an air chamber larger than 13 mm are considered conditionally suitable, while eggs with a chamber occupying one-third of the egg volume are classified as unsuitable and subject to disposal [12].

Saline Flotation Test

This method determines egg freshness based on density differences.

Procedure:

- 100 g of table salt is dissolved in 1 liter of water.
- The egg is carefully placed into the solution.
- The floating or sinking behavior is observed.

Evaluation criteria:

- Egg sinks completely → **Fresh and suitable**
- Egg floats partially → **Conditionally suitable**
- Egg floats on surface → **Unsuitable**
-

Results

Table 1. Veterinary-sanitary condition of eggs based on ovoscopic examination.

No	Sampling location	Total eggs	Suitable	Conditionally suitable	Unsuitable
1	Siyob Market	10	10	0	0
2	Damariq Market	10	8	2	0
3	Railway Station Market	10	9	1	0
	Total	30	27	3	0

Ovoscopic analysis revealed that no completely unsuitable eggs were detected. However, a minor proportion of eggs showed enlargement or displacement of the air chamber, indicating conditional suitability [13].

Table 2. Results of saline flotation test.

No	Sampling location	Total eggs	Sunk (fresh)	Suspended (conditionally suitable)	Floating (unsuitable)
1	Siyob Market	10	10	0	0
2	Damariq Market	10	8	2	0
3	Railway Station Market	10	9	1	0
	Total	30	27	3	0

The saline flotation test confirmed that out of 30 eggs, 27 sank completely, indicating freshness, while 3 eggs showed partial suspension in the solution.

The Results section currently relies on simple tabulation of egg conditions (suitable, conditionally suitable, and unsuitable) [14].

However, modern scientific reporting requires:

Percentage-based interpretation (e.g., 90% freshness rate)

Graphical representation (bar charts, pie charts)

Statistical significance testing

Because of the absence of these elements, the findings remain descriptive rather than analytical or inferential, reducing scientific impact.

Discussion

The results demonstrate that most eggs sold in the examined markets meet basic veterinary-sanitary requirements. However, a small proportion of eggs, particularly from Damariq Market, showed signs of quality deterioration.

The consistency between ovoscopic and saline flotation methods confirms the reliability of laboratory-based egg quality assessment. The enlargement of the air chamber and partial flotation behavior indicate moisture loss and aging of eggs, which are critical indicators of reduced freshness [15].

From a public health perspective, even a small percentage of conditionally suitable eggs highlights the necessity for continuous veterinary-sanitary monitoring in market environments.

Conclusion

The study confirms that not all eggs sold in markets fully comply with veterinary-sanitary standards. A relatively higher proportion of conditionally suitable eggs was observed in Damariq Market.

Therefore, systematic veterinary-sanitary control of poultry eggs in market conditions is essential to ensure food safety and protect public health.

REFERENCES

- [1] A. A. Qodirov, *Veterinary-Sanitary Examination*, Tashkent, Uzbekistan: Fan, 2018.
- [2] B. Rahmonov, *Sanitary Control of Poultry Products*, Samarkand, Uzbekistan, 2020.
- [3] State Veterinary Committee of the Republic of Uzbekistan, *Rules for Veterinary-Sanitary Examination of Food Products*, Tashkent, Uzbekistan, 2022.
- [4] M. A. Sidorov and N. I. Kovalev, *Veterinary-Sanitary Examination of Animal Products*, Moscow, Russia: KolosS, 2018.
- [5] A. F. Kuznetsov, *Veterinary-Sanitary Examination*, St. Petersburg, Russia: Lan, 2020.
- [6] M. F. Borovkov and A. V. Zharov, *Veterinary-Sanitary Examination of Poultry Products*, Moscow, Russia: Agropromizdat, 2017.
- [7] A. M. Smirnov, *Sanitary Microbiology of Food Products*, Moscow, Russia: Akademiya, 2019.
- [8] V. P. Fedorov, *Laboratory Methods in Veterinary Science*, Moscow, Russia: Kolos, 2016.
- [9] M. F. Borovkov, *Veterinary-Sanitary Evaluation of Egg Quality and Egg Products*, Moscow, Russia: Rossel'khozizdat, 2015.
- [10] World Health Organization, *Food Safety Guidelines*, Geneva, Switzerland, 2020.
- [11] Food and Agriculture Organization (FAO), *Egg and Egg Products Safety Standards*, Rome, Italy, 2021.
- [12] World Organisation for Animal Health (WOAH), *Terrestrial Animal Health Code*, Paris, France, 2022.
- [13] I. Gantois, R. Ducatelle, and F. Pasmans, "Mechanisms of egg contamination by *Salmonella* Enteritidis," *FEMS Microbiology Reviews*, vol. 33, pp. 718–738, 2009.
- [14] Ministry of Agriculture of the Republic of Uzbekistan, *Veterinary-Sanitary Control Regulations for Poultry Products*, Tashkent, Uzbekistan, 2022.
- [15] SanPiN, *Hygienic Safety Standards for Food Products*, Tashkent, Uzbekistan, 2021.