

PROCEEDING OF 9TH INTERNATIONAL SCIENTIFIC CONFERENCE,
COLLEGE OF VETERINARY MEDICINE UNIVERSITY OF BASRAH, NOV.
6-7, 2024, IRAQ.

BASRAH JOURNAL OF VETERINARY RESEARCH, 2025, 24(S1):22-31.

<https://bjvr.uobasrah.edu.iq/>

**Effect Of Dipping Eggs in Different Concentration of Acetic Acid on the
Internal and External Qualitative Traits of Eggs**

**Chro Rafeq Aziz¹, Shokhan Mohammed Ali¹, Jaza Ali Mohammed¹, Questan Ali Ameen²,
Ahmed Sami Shaker¹.**

1 -Animal Production department, directorate of agricultural research, Sulaimani, Iraq.

2 -Animal production sciences department, College of agricultural engineering, university of Sulaimani, Sulaimani, Iraq.

Corresponding Author Email Address: jaza1977.ali@gmail.com

ORCID ID: <https://orcid.org/0009-0006-4271-7802>

DOI: <https://doi.org/10.23975/bjvr.2025.156249.1188>

Received: 30 Dec. 2024 **Accepted:** 30 March 2025

Abstract

This study evaluated the effects of treating eggs with varying concentrations of acetic acid (0%, 5%, 10%, and 15%) on internal and external egg quality traits. A total of 40 fresh chicken eggs were divided equally among the four treatment groups. Eggs were immersed in their respective acetic acid solutions for 10 minutes, followed by rinsing and air-drying. Quality parameters, including weight, external dimensions, shell thickness, and internal traits, were measured before and after treatment. External traits such as egg breadth showed significant differences ($P<0.05$), with higher values observed at 5% and 10% concentrations, while egg length and shell thickness remained unaffected. Internal traits such as yolk and albumin weights were significantly influenced ($P<0.05$), with optimal values noted at 10% concentration. Egg volume and surface area also increased significantly with acetic acid treatments, particularly at higher concentrations (10% and 15%), while the shape index remained stable. Density-related traits such as egg and yolk density peaked at 10% and 5%, respectively, reflecting enhanced structural integrity and nutrient retention. The shell weight per surface area was highest at 5% concentration, suggesting improved calcium deposition. Overall, acetic acid concentrations of 5%-10% demonstrated the most favorable effects on egg traits, indicating the potential for moderate acid treatments to enhance certain quality parameters without compromising structural integrity. These findings provide valuable insights for optimizing acetic acid use in egg preservation and hatchery practices, warranting further research into extended exposure durations and alternative acids.

Keywords: egg, internal, external, acetic acid

Introduction

Acetic acid, present in vinegar, may drastically alter the interior characteristics of an egg. Soaking an egg in acetic acid dissolves the calcium carbonate shell, resulting in the preservation of the inner membrane. This makes the egg's structure more gelatinous and less protected, but the yolk and egg white stay unaltered; nonetheless, the overall texture becomes more malleable and the egg appears more translucent (1). The interior components of a chicken egg consist of the yolk, albumen, chalazae, and shell membrane. These components collaborate to safeguard and feed the growing embryo or enhance the texture and taste of diverse cuisines (2). The exterior characteristics of a chicken egg include the shell, a rigid, protective outer covering mostly composed of calcium carbonate, serving as a barrier against bacterial intrusion and physical harm. The shell color varies from white to brown, depending upon the chicken breed, and its form is often round or slightly pointed at one end (3). The eggshell is essential for hatchability, influencing the development and emergence of a chick. An undamaged eggshell is crucial for safeguarding the developing embryo from physical harm and bacterial infection. Optimal porosity facilitates sufficient gas exchange and moisture control, whilst appropriate shell thickness prevents fracture and provides suitable protection. The calcium content in the shell enhances its strength and endurance; inadequate calcium results in weaker shells, adversely affecting hatchability. A well-structured eggshell with enough strength,

porosity, and thickness is essential for the healthy growth and hatching of a chick (4). This study aimed to evaluate the effects of treating eggs with different concentrations of acetic acid on various internal and external egg quality traits.

Materials and Methods

This experiment was conducted in the fields of the Animal Production Department, Directorate of Agricultural Research in Sulaymaniyah, fresh chicken eggs were purchased from a local farm and randomly allocated into four treatment groups based on the concentration of acetic acid: T1= 0% (control), T2= 5%, T3= 10%, and T4= 15%. Each treatment group consisted of 10 eggs. The eggs were cleaned using distilled water to remove any debris and then allowed to dry at room temperature before treatment. The acetic acid solutions were prepared by diluting glacial acetic acid (analytical grade) with distilled water to achieve the desired concentrations of 0%, 5%, 10%, and 15%. The eggs in each group were immersed in the respective solutions for 10 minutes at room temperature. After immersion, the eggs were removed from the solutions, rinsed with distilled water, and allowed to air-dry. Egg quality parameters were then assessed, including both external and internal traits. Egg Weights were weighed before and after treatment using a digital balance with a precision of ± 0.01 g. The weights were recorded to evaluate changes due to treatment. External Traits of the eggs, including length, breadth, and shell thickness, were measured using the following methods: Length and Breadth Were Measured using a digital caliper with an

accuracy of ± 0.01 mm, Shell Thickness: Measured at three points (top, middle, and bottom) using a micrometer screw gauge. The volume and Surface Area of the eggs were determined using the Archimedes principle by submerging the eggs in water and measuring the displaced volume. The surface area was calculated using an empirical formula based on egg dimensions:

$$\text{Surface Area} = 4.835 \times (\text{Length} \times \text{Breadth})^{0.5}$$

The shape index was calculated as:

$$\text{Shape Index} = (\text{Breadth}/\text{Length}) \times 100$$

The internal traits such as yolk weight, albumin weight, and eggshell weight were measured after carefully cracking the eggs. Each component was separated and weighed individually using the same digital balance. The data were analyzed using one-way analysis of variance (ANOVA) to determine the effect of acetic acid concentration on each

parameter. Post hoc comparisons were conducted using Tukey's test for multiple comparisons. Differences were considered statistically significant at $P < 0.05$. All statistical analyses were performed using SPSS (Version 25.0, IBM Corp., Armonk, NY, USA).

Result

Table 1 demonstrates the effect of treating eggs with different concentrations of acetic acid on their weight. The results indicate no significant differences in egg weight before and after treatment across all acetic acid concentrations (0%, 5%, 10%, and 15%). Initial and final weights remained consistent, as indicated by the statistical insignificance (N.S.). For instance, eggs treated with 0% acetic acid had an initial and final weight of 49.47 ± 0.49 g, while eggs treated with 15% acetic acid showed a minor decrease from 49.66 ± 0.47 g to 49.44 ± 0.47 g, which was not statistically significant.

Table 1: the effect of treated the egg with different concentrations of acetic acid on egg weight.

Treatment	Egg Weight Before (g)	Egg Weight After (g)
0%	49.47 ± 0.49 a	49.47 ± 0.49 a
5%	50.58 ± 0.52 a	50.43 ± 0.52 a
10%	50.85 ± 0.38 a	50.72 ± 0.38 a
15%	49.66 ± 0.47 a	49.44 ± 0.47 a
Sig.	N.S.	N.S.

Means not having a common letter within each column differ significantly ($P < 0.05$).

Table 2 shown the effect of treated the egg with different concentrations of acetic acid on egg external traits (length, breadth, and shell thickness). As it shown the eggs breadth were significantly differencing among the treatments ($P<0.05$). The egg breadth was higher in both treatment 2, and 3 (40.39, and 40.41) mm respectively, and low in treatment 1, which was (39.84) mm. Moreover the egg

length, and eggshell thickness did not shown and significant differences among the treatments. The results in Table 2 indicate that acetic acid treatment had a significant effect on egg breadth, with eggs in the 5% and 10% treatment groups exhibiting the highest breadth values (40.39 mm and 40.41 mm, respectively).

Table 2: the effect of treated the egg with different concentrations of acetic acid on egg external traits

Treatment	Egg Length	Egg Breadth	Eggshell Thickness
0%	54.02±0.38 a	39.84±0.20 b	0.52±0.02 a
5%	54.23±0.28 a	40.39±0.16 a	0.39±0.01 a
10%	53.84±0.25 a	40.41±0.15 a	0.36±0.01 a
15%	53.67±0.31 a	39.94±0.18 ab	0.98±0.63 a
Sig.	N.S.	*	N.S.

Means not having a common letter within each column differ significantly ($P<0.05$).

Table 3 shown the effect of treated the egg with different concentrations of acetic acid on egg volume, surface area, and shape index. As it shown the egg volume, and surface area were differing significantly among the treatments. The egg volume was higher in treatment 2, 3, 4 and low in treatment 1 (49.30, 49.46, 50.14, and 45.28) mm respectively. The egg surface area was higher in treatment 3, and low in treatment 1 (89.50, and 85.55) respectively. But the egg shape index did not show any significantly differing among the treatments. Table 4 shown the effect

of treated the egg with different concentrations of acetic acid on internal egg traits weight (yolk, albumin, shell). The traits were significantly differing among the treatments. The yolk weight was higher in both treatment 3, and 4 (15.91, and 16.20) g respectively, and lower in treatment 1 (14.80) g. The albumin weight was higher in treatment 3, and lower in treatment 4 (30.83, and 28.70) g respectively. The eggshell weight was higher in both treatment 2, and 3 (4.75, and 4.57) g respectively, and lower in both treatment 1, and 4 (4.29, and 4.12) g respectively.

Table 3: shown the effect of treated the egg with different concentrations of acetic acid on egg volume, surface area, and shape index.

Treatment	Egg Volume	Egg Surface Area	Egg Shape Index
0%	45.28±0.52 b	85.55±0.86 c	73.89±0.48 a
5%	49.30±0.22 a	88.33±0.68 ab	74.57±0.43 a
10%	49.46±0.13 a	89.50±0.59 a	75.12±0.38 a
15%	50.14±0.17 a	86.47±0.66 bc	74.47±0.32 a
Sig.	***	***	N.S.

Means not having a common letter within each column differ significantly (P<0.05).

Table 4: the effect of treated the egg with different concentrations of acetic acid on internal egg traits weight (yolk, albumin, shell).

Treatment	Yolk Weight	Albumin Weight	Eggshell Weight
0%	14.80±0.22 c	29.26±0.48 bc	4.29±0.13 b
5%	15.37±0.16 b	30.31±0.38 ab	4.75±0.07 a
10%	15.91±0.18 a	30.83±0.38 a	4.57±0.07 a
15%	16.20±0.17 a	28.70±0.37 c	4.12±0.07 b
Sig.	***	**	***

Means not having a common letter within each column differ significantly (P<0.05).

Table 5 shown the effect of treated the egg with different concentrations of acetic acid on the yolk and albumin volume. There were significant differences among the treatments in both the yolk, and albumin volume. The yolk volume was higher in treatment 4, and low in table 2 (16.10, and 14.80) mm³ respectively. Albumin volume was higher in treatment 3, and low in treatment 4 (30.94, and 29.01) mm³ respectively. Table 6 shown the effect of treated the egg with different concentrations of acetic acid on the egg traits

density. The egg density, yolk density, and the shell weight per surface area were significantly differing among the treatments. The egg density was higher in treatment 3, and low in treatment 1 (1.08, and 0.97) respectively. The yolk density was higher in treatment 2 and low in treatment 1 (1.06, and 0.98) respectively. The shell weight per surface area was higher in treatment 2, and low in treatment 4 (0.0537, and 0.0478) respectively. non-significant differences were observed in the albumin density.

Table 5: the effect of treated the egg with different concentrations of acetic acid on the yolk and albumin volume.

Treatment	Yolk Volume	Albumin Volume
0%	15.39±0.44 ab	29.89±0.57 ab
5%	14.80±0.32 b	29.80±0.40 ab
10%	15.61±0.24 ab	30.94±0.49 a
15%	16.10±0.22 a	29.01±0.40 b
Sig.	*	*

Means not having a common letter within each column differ significantly (P<0.05).

Table 6: the effect of treated the egg with different concentrations of acetic acid on the egg traits density.

Treatment	Egg Density	Yolk Density	Albumin Density	Shell weight per surface area
0%	0.97±0.02 c	0.98±0.02 b	0.99±0.01 a	0.0499±0.0014 bc
5%	1.05±0.01 ab	1.06±0.03 a	1.02±0.01 a	0.0537±0.0005 a
10%	1.08±0.02 a	1.02±0.01 ab	1.00±0.01 a	0.0509±0.0007 b
15%	1.06±0.01 ab	1.01±0.01 ab	0.99±0.01 a	0.0478±0.0008 c
Sig.	***	*	N.S.	***

Means not having a common letter within each column differ significantly (P<0.05).

Discussion

In our results, the lack of significant differences in egg weight before and after acetic acid treatments suggests that acetic acid concentrations up to 15% do not substantially alter egg mass. This stability might be due to the minimal effect of acetic acid on the shell and internal composition during the treatment period. Previous studies also reported no significant impact of mild acid treatments on egg weight (5, 6). Acetic acid treatments have been studied for their

potential antimicrobial benefits (7), but weight stability indicates that these treatments are unlikely to compromise the egg's structural integrity. Further investigation could explore extended treatment durations or higher concentrations to determine thresholds for weight alteration (8). This finding aligns with studies suggesting that mild acid treatments can influence external egg dimensions, potentially due to their impact on eggshell elasticity or structural changes (9). Conversely, the control group (0%) exhibited

the lowest egg breadth (39.84 mm), while the 15% group showed intermediate values. The differences in egg breadth ($P < 0.05$) might reflect the interaction between acetic acid concentration and shell structure during treatment. Egg length and shell thickness, however, remained statistically unaffected ($P > 0.05$), consistent with prior research suggesting that short-term treatments with organic acids minimally affect these traits (5). Acetic acid likely interacts more strongly with surface features, as seen in antimicrobial studies (7). Future work could investigate longer exposure durations or alternate acid types to determine their potential effects on shell traits (8, 10). The results indicate that treating eggs with different concentrations of acetic acid significantly affected egg volume and surface area but not the shape index. Higher concentrations (5%, 10%, and 15%) increased egg volume compared to the control (0%), with treatment 4 (15%) showing the highest volume (50.14 mm). Similarly, surface area was significantly enhanced in the 10% treatment (89.50 mm²), suggesting that moderate acetic acid exposure might optimize these parameters. These changes could result from the acid's impact on the eggshell's structural integrity, leading to osmotic fluid absorption (11). However, the lack of significant differences in shape index suggests that acid treatments did not alter the geometric proportions of the eggs. This consistency may reflect a biological constraint in maintaining shape for functionality (12). The findings align with previous studies highlighting acetic acid's role in altering eggshell permeability and structure (13, 7). These insights could have applications in egg preservation and hatchery

practices, emphasizing the need for further research to balance volume and surface area improvements with structural integrity. The results demonstrate that varying concentrations of acetic acid significantly affected the internal egg traits, particularly yolk, albumin, and shell weights. Higher yolk weights in the 10% and 15% treatments suggest enhanced nutrient retention, possibly due to improved membrane permeability from acid exposure (14). The highest albumin weight in the 10% treatment indicates optimal protein stabilization, aligning with findings by (15). However, reduced albumin weight at 15% may result from excessive acid-induced protein denaturation (16). The eggshell weight peaked at 5% and 10%, potentially reflecting acid-driven calcium retention (17). These findings emphasize the nuanced effects of acetic acid on egg quality. The results indicate that acetic acid concentrations significantly influenced yolk and albumin volumes. Higher yolk volume in the 15% treatment suggests improved osmotic balance, possibly due to membrane permeability changes induced by acid exposure (18). Conversely, lower yolk volume in the 5% treatment may reflect insufficient acid interaction to enhance water retention (19). Albumin volume was highest in the 10% treatment, aligning with optimal protein hydration conditions, as reported by (20). However, reduced albumin volume in the 15% treatment suggests excessive acid exposure leading to dehydration or structural protein changes. The study reveals significant effects of acetic acid on egg trait densities, except albumin density. Higher egg density at 10% concentration suggests enhanced structural integrity and water

retention, consistent with findings by (21). Yolk density peaked at 5%, indicating optimized nutrient concentration, potentially due to moderate acid-induced osmoregulatory changes (22). The higher shell weight per surface area in the 5% treatment suggests improved calcium deposition, aligning with (23). Lower values for these traits in treatments 1 and 4 highlight insufficient or excessive acid exposure adversely impacting structural and compositional

Conclusion

The study demonstrates that treating eggs with varying concentrations of acetic acid (0%-15%) significantly affects certain external, internal, and density-related traits. While egg weight remained stable, egg breadth, volume, and surface area showed significant differences, particularly at 5% and 10% concentrations. Internal traits like yolk and albumin weights and densities were influenced, with optimal values observed at moderate concentrations (10%). Shell-related traits also exhibited significant changes, indicating improved calcium deposition and structural adjustments at lower concentrations. These findings highlight acetic acid's potential to modify egg characteristics without compromising integrity, providing insights for optimizing egg treatments in preservation and hatchery applications.

Conflicts of interest

The authors declare that there is no conflict of interest.

Ethical Clearance

This work is approved by The Research Ethical Committee.

References

1. Kadim, I., Al-Marzooqi, W., Mahgoub, O., Al-Jabri, A. & Al-Waheebi, S. (2008). Effect of Acetic Acid Supplementation on Egg Quality Characteristics of Commercial Laying Hens during Hot Season. *International Journal of Poultry Science*. 7 (10): 1015-1021. DOI:
2. Pu J, Hu J, Xiao J, Li S, Wang B, Wang J, Geng F. (2024). Integrated landscape of chicken egg chalaza proteomics. *Poult Sci*.103(5):103629. DOI: <http://doi.org/10.1016/j.psj.2024.103629>.
3. Lifshitz, A., Baker, R., & Naylor, H. (2006). The Relative Importance of Chicken Egg Exterior Structures in Resisting Bacterial Penetration. *Journal of Food Science*. 29. 94-99. DOI: <http://doi.org/10.1111/j.1365-2621.1964.tb01700.x>.
4. Zhang N, Zhang H, Fan G, Sun K, Jiang Q, Lv Z, Han B, Nie Z, Shao Y, Zhou Y, Zhang B, Wu X, Pan T. (2023). Effects of Eggshell Thickness, Calcium Content, and Number of Pores in Erosion Craters on Hatching Rate of Chinese Alligator Eggs. *Animals (Basel)*. 13(8):1405. DOI: <http://doi.org/10.3390/ani13081405>.
5. Brettfeld, E.-G., Popa, D.-G., Somoghi, R., Nicolae, C. A., Birtas, A., Constantinescu-Aruxandei, D., & Oancea, F. (2023). The Preparation and Characterization of Different Types of Eggshells Acidified with Acetic Acid. *Chemistry Proceedings*, 13(1), 32. <https://doi.org/10.3390/chemproc2023013032>
6. He Z, Chen X, Shi X, Li X, Li C, Li J, Xu G, Yang N, Zheng J. (2020). Acetic acid,

- vinegar, and citric acid as washing materials for cuticle removal to improve hatching performance of quail eggs. *Poult Sci.* 99(8):3865-3876. DOI: <http://doi.org/10.1016/j.psj.2020.04.018>.
7. Ryssel H, Kloeters O, Germann G, Schäfer T, Wiedemann G, Oehlbauer M. (2009). The antimicrobial effect of acetic acid--an alternative to common local antiseptics? *Burns.* 35(5):695-700. DOI: <http://doi.org/10.1016/j.burns.2008.11.009>.
8. Webber, Charles & Jr, Paul & Shrefler, James & Spaunhorst, Doug. (2018). Impact of Acetic Acid Concentration, Application Volume, and Adjuvants on Weed Control Efficacy. *Journal of Agricultural Science.* 10(8): 1-6. DOI: <http://doi.org/10.5539/jas.v10n8p1>.
9. Yan, Y., Sun, C., Lian, L., Zheng, J., Xu, G., & Yang, N. (2014). Effect of Uniformity of Eggshell Thickness on Eggshell Quality in Chickens. *The Journal of Poultry Science.* 51. 338-342. DOI: <http://doi.org/10.2141/jpsa.0130032>.
10. Johnson, Erynn. (2021). Breaking down shell strength: inferences from experimental compression and future directions enabled by 3D printing. *Biological reviews of the Cambridge Philosophical Society.* 96(3). DOI: <http://doi.org/10.1111/brv.12692>.
11. Torres-Mansilla, A., Delgado-Me, E. (2017). Influence of Separation Techniques with Acid Solutions on the Composition of Eggshell Membrane. *International Journal of Poultry Science.* 16. 451-456. DOI: <http://doi.org/10.3923/ijps.2017.451.456>.
12. Narushin, V., Romanov, M., Salamon, A. & Kent, J. (2023). Egg Quality Index: A more accurate alternative to the Haugh unit to describe the internal quality of goose eggs. *Food Bioscience.* 55: 102968. DOI: <http://doi.org/10.1016/j.fbio.2023.102968>.
13. Olson SK, Greenan G, Desai A, Müller-Reichert T, Oegema K. (2012). Hierarchical assembly of the eggshell and permeability barrier in *C. elegans*. *J Cell Biol.* 198(4):731-48. DOI: <http://doi.org/10.1083/jcb.201206008>.
14. Khan, S. H., & Iqbal, J. (2015). Recent advances in the role of organic acids in poultry nutrition. *Journal of Applied Animal Research,* 44(1), 359–369. DOI: <https://doi.org/10.1080/09712119.2015.1079527>
15. CANN JR. (1961). Spectroscopic evidence for complexing of acetic acid with bovine serum albumin, gramicidin, and dimethylformamide. *Biophys J.* 1(8):711-21. DOI: [http://doi.org/10.1016/s0006-3495\(61\)86918-x](http://doi.org/10.1016/s0006-3495(61)86918-x).
16. Rajalingam D, Loftis C, Xu JJ, Kumar TK. (2009). Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate. *Protein Sci.* 18(5):980-93. DOI: <http://doi.org/10.1002/pro.108>.
17. wiatkiewicz, S., Arczewska-Włosek, A., Krawczyk, J., Puchała, M., & Józefiak, D. (2015). Effects on performance and eggshell quality of particle size of calcium sources in laying hens' diets with different Ca concentrations. *Archives Animal Breeding.* 58. 301-307. DOI: <http://doi.org/10.5194/aab-58-301-2015>.
18. Kitanovic A, Bonowski F, Heigwer F, Ruoff P, Kitanovic I, Ungewiss C, Wölfl S. (2012) Acetic acid treatment in *S. cerevisiae* creates significant energy deficiency and nutrient starvation that is dependent on the activity of the mitochondrial transcriptional complex Hap2-3-4-5. *Front Oncol.* 21;2:118. DOI: <http://doi.org/10.3389/fonc.2012.00118>.

19. Martínez, Y., Almendares, C. I., Hernández, C. J., Avellaneda, M. C., Urquía, A. M., & Valdivié, M. (2021). Effect of Acetic Acid and Sodium Bicarbonate Supplemented to Drinking Water on Water Quality, Growth Performance, Organ Weights, Cecal Traits and Hematological Parameters of Young Broilers. *Animals*, 11(7), 1865. <https://doi.org/10.3390/ani11071865>
20. Abd El-Ghany, W. A. (2024). Applications of Organic Acids in Poultry Production: An Updated and Comprehensive Review. *Agriculture*, 14(10), 1756. <https://doi.org/10.3390/agriculture14101756>
21. eyhan YE, Yilmaz H, Hokelek M. (2016). Effects of acetic acid on the viability of *Ascaris lumbricoides* eggs. Is vinegar reliable enough to clean the vegetables? *Saudi Med J*. 37(3):288-92. DOI: <http://doi.org/10.15537/smj.2016.3.13061>
22. Wang Y, Luo W, Wang B, Wu D, Wang J, Geng F. (2023). Changes in chicken egg yolk metabolome during its formation. *Poult Sci*. 102(12):103154. DOI: <http://doi.org/10.1016/j.psj.2023.103154>.
23. Fu Y, Zhou J, Schroyen M, Zhang H, Wu S, Qi G, Wang J. (2024). Decreased eggshell strength caused by impairment of uterine calcium transport coincide with higher bone minerals and quality in aged laying hens. *J Anim Sci Biotechnol*. 15(1):37. DOI: <http://doi.org/10.1186/s40104-023-00986-2>.

تأثير غمس البيض في تراكيز مختلفة من حمض الخليك على الصفات النوعية الداخلية والخارجية للبيض

جرو رفيق عزيز^١، شوخان محمد علي^١، جزا علي محمد^١، كويستان علي أمين^٢، أحمد سامي شاكر^١

١- قسم الإنتاج الحيواني، مديرية البحوث الزراعية، السليمانية، العراق.

٢- قسم علوم الإنتاج الحيواني، كلية الهندسة الزراعية، جامعة السليمانية، السليمانية، العراق.

الخلاصة

اجريت هذه الدراسة لتقييم آثار معالجة البيض بتركيزات مختلفة من حمض الخليك (0٪، 5٪، 10٪، و15٪) على الصفات النوعية للبيض (الداخلية والخارجية). اذ تم تقسيم ما مجموعه 40 بيضة دجاج طازجة بالتساوي بين مجموعات المعالجة الأربع. تم غمر البيض في محاليل حمض الخليك الخاصة به لمدة 10 دقائق، تليها الشطف والتجفيف بالهواء. تم قياس معايير الجودة، بما في ذلك الوزن والأبعاد الخارجية وسمك القشرة والصفات الداخلية، قبل وبعد المعالجة. أظهرت الصفات الخارجية مثل عرض البيضة اختلافات كبيرة، مع ملاحظة قيم أعلى عند تركيزات 5٪ و10٪، في حين ظل طول البيضة وسمك القشرة دون تأثير. تأثرت الصفات الداخلية مثل وزن الصفار والألبومين بشكل كبير، مع ملاحظة القيم المثلى عند تركيز 10٪. كما زاد حجم البيضة ومساحة سطحها بشكل كبير مع معالجات حمض الخليك، وخاصة عند التركيزات الأعلى (10٪ و15٪)، في حين ظل معامل شكل البيضة ثابتاً. بلغت الصفات المرتبطة بالكثافة، مثل كثافة البيض والصفار، ذروتها عند 10٪ و5٪ على التوالي، مما يعكس تعزيز السلامة الهيكلية واحتفاظ البيض بالعناصر الغذائية. بلغ وزن القشرة لكل مساحة سطحية أعلى مستوياته عند تركيز 5٪، مما يشير إلى تحسن في ترسب الكالسيوم. بشكل عام، أظهرت تركيزات حمض الخليك التي تتراوح بين 5٪ و10٪ أفضل التأثيرات على صفات البيض، مما يشير إلى إمكانية تحسين بعض معايير الجودة باستخدام معالجات حمضية معتدلة دون المساس بالسلامة الهيكلية. توفر هذه النتائج رؤى قيمة لتحسين استخدام حمض الخليك في حفظ البيض وممارسات التفريخ، مما يستدعي إجراء المزيد من البحوث حول فترات التعرض الطويلة ولأحماض بديلة.

الكلمات المفتاحية: بيضة، داخلية، خارجية، حمض الخليك.