Iraqi Journal of Agricultural Sciences –2026:57(7):1893-1902
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/8307kw57

Fifth and Sixth Exons Polymorphisms of Ovocalyxin-32 Gene and Its Effect on Productive Traits and Egg Quality of Local Iraqi Chickens

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ABSTRACT

This study was conducted to investigate the genotype variations in the ovocalyxin-32 (OCX-32) gene polymorphisms and its effect on productive performance and egg quality traits. A total of 100 prepubertal local hens were used, each housed individually in numbered cages. Blood samples were collected for molecular analysis, starting with DNA extraction, followed by PCR amplification. Subsequently, sequencing analysis was performed. Then the A22385462>G SNP was identified, and it had high significant difference($P \leq 0.01$) in the genotypes distribution percentages. The mutant genotype GG outperformed the AG and AA genotypes, of 45.48%, 42.47%, and 2.4%, respectively. Weekly assessments were conducted to evaluate the influence of this SNP of the different genotypes on productive traits and the results indicated it had high significant differences ($P \leq 0.01$) in weekly feed consumption The mutant GG genotype significantly outperformed the AA genotype with (687.57g) in week 11, and superiority in feed consumption ($P \leq 0.05$) during weeks 12 (686.68g) and 13 (687.96g), while the hybrid AG genotype surpassed AA genotype with 671.76g in week 13. In the average sexual maturity weight, statistically significant differences ($P \leq 0.05$) were observed, though the AG genotype exhibited a higher mean 1438.30 g compared to the AA genotype. This study revealed a significant effects of the A22385462>G SNP polymorphisms on productive performance and no significant differences observed on qualitative traits of egg in the local chickens.

Key words: age maturity,egg production,eggshell, local chickens.

Received: 23/4/2025, Accepted: 13/7/2025, Published: 31/7/2026

INTRODUCTION

Avian eggshell quality is an important trait of commercial egg production, eggshells are the primary packaging material and antimicrobial barrier(Bhattacharya et al., 2015), although the total number of eggs produced during the egg production cycle is important, each egg must be structurally intact and be able to withstand both physical and microbial conditions(Ketta & Tůmová, 2016). The eggshell is a highly ordered structure resulting from the deposition of calcium carbonate(Jonchère et al., 2010), although the total number of eggs produced during the egg production cycle is important, each egg must be structurally intact and be able to withstand both physical and microbial challenges(D'Aoust, 2009; Gast et al., 2024). Ovocalyxin-32 (OCX-32) is a major component of the oviduct environment in birds and is present during eggshell formation, it is primarily found in the eggshells of birds(Yacoub et al., 2024), especially in chicken eggs, it is produced in the oviduct mucosa and is a part of the egg defense system(Le Roy et al., 2021). SNP variations in OCX-32 have been observed in several poultry breeds, including Rhode Island Red. It is considered a potential candidate gene that affects eggshell traits (Le Roy et al., 2021). OCX-32 gene encodes an eggshell matrix protein and is present in the uterine and isthmic regions of the oviduct where eggshell

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formation occurs(Sah & Mishra, 2018). The OCX-32 protein is part of the natural defense system that allows birds to protect their eggs from environmental pathogens. OCX-32 contributes to the formation of the hard shell of the egg, thereby protecting its contents from external shock and damage. OCX-32 significantly influenced shell color in some egg species, with particularly significant effects on shell weight, thickness, albumen height, early egg weight, yolk weight, and yolk diameter. OCX-32 is associated with the eggshell cuticle and its antimicrobial activity may play a protective role in ensuring eggshell and embryo viability(Xing et al., 2010). Eggshell quality and thickness are major concerns in poultry industry. It is estimated that more than 10% of the eggs produced in layered houses cannot be collected. or may break before intended use(Kibala et al., 2018). The commercial production and marketing of eggs exposes a large number of eggs to breakage or cracked eggshells, which is responsible for significant economic losses for the eggs produced(Liu et al., 2016). The aim of this study is to detect the A22385462>G SNP in the OCX-32 gene and investigate the effect of OCX-32 Genotype on productive performance and qualitative traits in Iraqi local chickens. This research the role of OCX-32 as a candidate gene for improving eggshell quality and production efficiency, providing insights to enhance poultry product standards in the industry.

MATERIALS AND METHODS

Experimental brides: The experiment utilized 100 sexually mature, individually housed in sequentially numbered cages at a poultry facility within the College of Agriculture, Abu Ghraib. Chickens were monitored for 100 days post-sexual maturity to record the (feed consumed (grams), the number of eggs produced, the mass of the eggs (grams), the average egg weight (grams), the age at sexual maturity, the weight at sexual maturity, and the eggs quality traits were calculated. Feed consumption was quantified by allocating 100 g of diet per bird daily, dispensed into pre-weighed, labeled bags to calculate weekly intake. Data on production traits (egg count, feed efficiency) and health metrics were systematically recorded for each bird. To standardize conditions, regimen was implemented throughout the trial, and birds were provided access to water supplemented with 0.5 g/L vitamin C on the first day post-arrival. Diets were administered at fixed intervals to minimize variability. Molecular analyses, conducted at the Molecular Genetics Laboratory (College of Agricultural Engineering Sciences, Al-Jadriya), complemented phenotypic data collection.

Blood sampling for molecular tests: Three milliliters of blood were collected from the brachial vein of each chicken used in the experiment at the age of 15 weeks, and the blood was placed in tubes containing anticoagulant (EDTA). The samples were kept at a freezing temperature of -20 °C until the molecular tests were performed. DNA extraction was done using the Geneaid®-Kit Company (Taiwan). Some modification to the extraction protocol was done.

Polymerase chain reaction (PCR): PCR amplification was conducted targeting a specific region of the ovoclaxin-32 gene, encompassing exons 5 and 6, which yielded a product of 908 base pairs (bp), as illustrated in Figure (1). Amplification was carried out using the following primer pair: forward primer, 5'-AGCCAGGTATCACAGCCATC-3’ and reverse primer, 5'-AGATGGAAAGTTGGGGTCAAA-3.’ Subsequently (11), the PCR product was electrophoresed on a 1.5% (w/v) agarose gel supplemented with 0.2 µL ethidium bromide. Post-electrophoresis, DNA bands were visualized under ultraviolet (UV) illumination, and gel documentation was performed using a digital imaging system to capture high-resolution images of the electrophoretic profiles (19). The PCR was performed using the GoTaq® Green Master Mix (Promega) under the following thermal cycling conditions: initial denaturation at 94°C for 5 min, followed by 32 cycles of denaturation at 94°C for 30 s, annealing at 62°C for 30 s, and elongation at 72°C for 30 s, with a final extension step at 72°C for 1 min. The PCR products were analyzed using a DNA ladder ranging from 100 to 1000 base pairs (bp) to verify the amplification and size of the target

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fragments.

Statistical analysis: The data were analyzed statistically using the Statistical Analysis System (SAS) program to study the effect of the genetic variation of the ovoclaxin-32 gene on the studied traits, and the significant differences between the means were compared using the (Duncan, 1955) multinomial test by applying the least square means method.

model: $Y_{ij} = \mu + G_i + e_{ij}$ where, Y_{ij}: observation value j due to genotype i.

μ: overall mean. G_i: Impact of multiple genetic polymorphisms of the osteocalcin (Ovocalyxin-32) gene based on obtained variations. e_{ij}: error term.

RESULTS AND DISCUSSION

This study investigated the A22385462>G polymorphism within the OCX-32 gene and its association with egg production and quality traits in Iraqi chickens. Genomic DNA was extracted, followed by PCR amplification and electrophoresis to analyze the target region spanning exons 5 and 6 of the OCX-32 gene, which yielded a 908 bp fragment shown in Figure (1). Genotypic analysis as shown in Figure (2) ,revealed three distinct genotypes (AA, AG, and GG) and significant genotype variability ($P \leq 0.01$) , with the mutant allele G exhibiting a higher prevalence than the wild-type allele A. The influence of these genotypes on production traits, including weekly feed intake, egg weight, and egg mass, were evaluated, suggesting a potential functional role for the OCX-32 gene in modulating egg production efficiency and quality

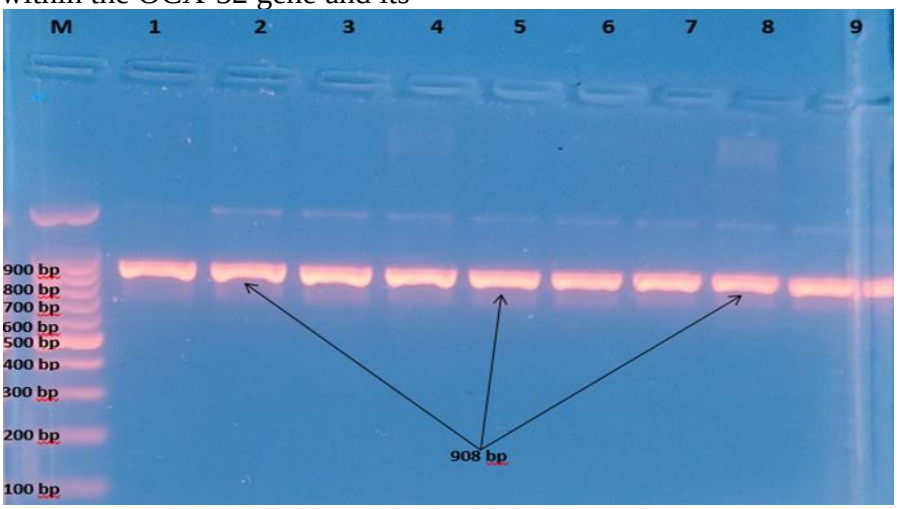

Figure 1. Electrophoresis of PCR product and the target reaction of ovocalyxin-32 gene M: Ladder (1000-100) bp, samples (9-1) 908bp

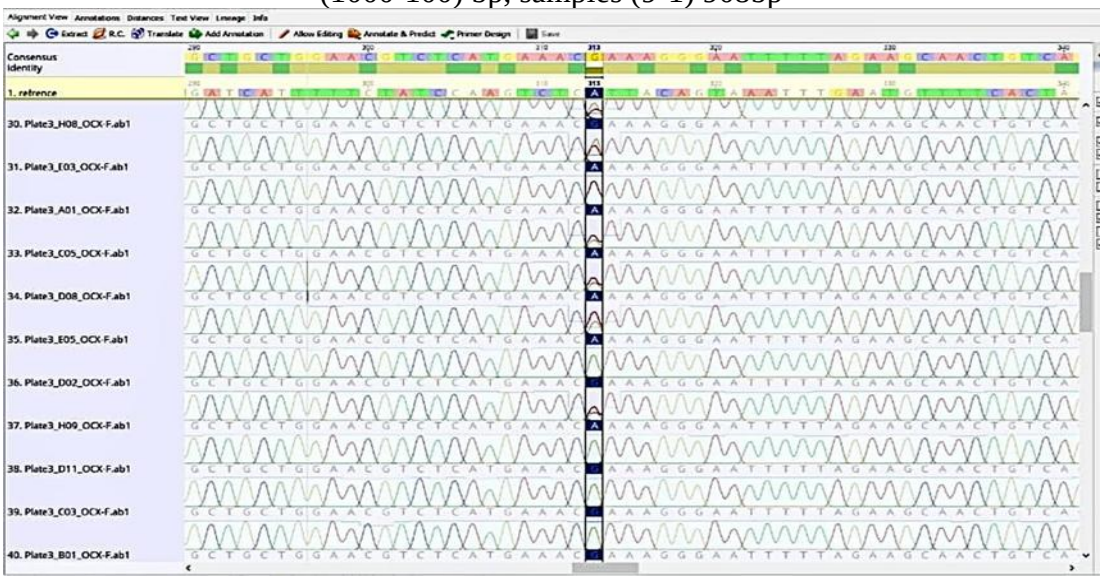

Figure 2. The nucleotides sequence of the target region of the ovoclaxin-32 gene for A22385462 > G SNP

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Genotypes of distribution and alleles frequency: The results presented in Table (1) reveal highly significant differences (P≤0.01) in the percentage distribution of various genotype of the OCX-32 SNP gene among Iraqi local chicken females. The mutant genotype GG significantly surpassed the AG and AA genotype, with percentages of 45.48, 42.47, and 12.4, respectively. Additionally, a highly significant difference (P≤0.01) was observed in the allelic frequencies, where the mutant allele G predominated over the wild-type allele A, with frequencies of 70.0% and 30.0%, respectively, shown in Figure (2). Previous studies on Iraqi chickens have identified OCX-32 polymorphisms, particularly the A22385462>G variant. These investigations have confirmed the presence of OCX-32 variants within the Iraqi local chicken population, providing specific genotype and allele frequencies(AL-Jaryan et al., 2021; Volkova et al., 2025). A study on Mazandaran indigenous chickens identified two SNPs in the OCX-32 gene(Bakherad & Bahrami, 2020). These studies demonstrated the presence of genotype diversity in the OCX-32 gene across various local chicken populations, with different allelic and genotypic frequencies observed in different breeds and strains.

Table 1. Number and percentage of genotypes and allele frequency of the ovocalyxin-32 gene (A22385462>G) in Iraqi local chickens hens.

Genotype	Number	Percentage (%)
AA	4	4.13
AG	46	47.42
GG	47	48.45
the total	97	100
Chi-square value (χ2)	---	38.381**
Allele		Repetition: Frequency
A		0.30
G		0.70
Significance		(**(P≤0.01

***: Significant (p ≤ 0.05), **: High significant (P≤0.01) , N.S: Non-significant**

Effect of OCX-32 (A22385462>G) SNP genotypes on weekly feed consumption: The influence of diverse genotypes of the OCX-32 A22385462>G SNP on weekly feed consumption. Table (2) reveals highly significant differences (p≤0.01) in the effect of the genotypes AA, AG, and GG of (A22385462>G) SNP on weekly and total feed consumption. The mutant genotype GG outperformed the AA genotype, with a difference reaching 687.57 g per week (week 11). Additionally, the results indicate significant differences (p≤0.05) among the genetic variants, with the heterozygous genotype AG surpassing the AA genotype in week 6 for feed consumption, reaching 671.76 g. These results were similar to those of other molecular studies on markers of another type; disagreed with the results of a previous study(Fulton et al., 2012), which indicated that there were no significant effects for the genotypes AG, GG, and AA. The mutant genetic composition GG also demonstrated superiority, reaching (686.68 and 687.96) grams in weeks (12 and 13), respectively. This trait is significant for the purpose of improving production characteristics, and controlling feed consumption could potentially enhance egg production, thereby affecting egg quality and chicken health. Additionally, the results indicated no significant differences among the genetic compositions in terms of weekly feed consumption for the remaining weeks and the total average feed consumption. This study revealed that the OCX-32 gene is linked to various eggshell quality traits and egg production characteristics. These traits are crucial for improving production efficiency, and managing feed consumption may enhance egg production, subsequently influencing egg quality and overall chicken health(Rohmah et al., 2022).

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Table 2. Effect of ovocalyxin-32 gene (A22385462>G) genotypes of Iraqi local chickens on weekly feed consumption (mean ± SE).

Periods	Genotypes			Significance Level
	AA	AG	GG	
1 week	580.50± 28.11	632.38±9.50	633.45±10.65	N.S
2 week	669.50±23.18	669.13±7.47	660.17±6.90	N.S
3 week	680.00±10.80	677.87±5.33	679.51±4.84	N.S
4 week	674.75±14.84	672.36±6.77	671.47±5.84	N.S
5 week	673.75±23.29	673.51±4.91	676.94±6.94	N.S
6 week	628.25±25.95^{b}	671.76±6.19^{a}	668.81±5.77^{a}	*
7 week	628.50±15.24	666.44±8.80	669.36±5.26	N.S
8 week	658.50±19.14	683.02±3.57	676.49±5.01	N.S
9 week	654.00±18.61	680.96±4.23	673.98±5.19	N.S
10 week	658.50±30.27	686.82±6.15	684.30±4.13	N.S
11 week	622.00±40.83^{b}	674.73±7.52^{a}	687.57±4.01^{a}	**
12 week	642.75±35.09 ^{b}	681.58±5.00^{a}	686.68±3.94^{a}	*
13 week	645.75±30.29^{b}	681.31±5.57^{a}	687.96±47.3^{a}	*
14+ 2 day week	846.00±29.28	874.00±7.87	878.85±6.82	N.S
Total	9263.25±239.71	9625.87±60.33	9635.53±46.92	N.S

***: Means with different letter within each row, **: Means with different letter within each row highly significant different, N.S: Non-significant**

Impact of OCX-32 SNP on weekly egg weight in Iraqi local chickens : The results in Table (3), show includes the impact of different genotypes of the A22385462>G gene on the mean weekly egg weight during the productive period. As indicated in Table 3 demonstrates highly significant effects (P≤0.01) of different genotypes the OCX-32 SNP on the weekly egg weight rate. The mutant genotype GG outperformed the AA genotype, reaching 59.51 and 51.26 grams per week in weeks 3 and 4, respectively. The positive influence of the GG genotype in A22385462>G during weeks 3 and 4 is evident, and this increase is significant for the trait of weekly egg weight rate, as it contributes to improving long-term production management. Meanwhile, a significant difference (p≤0.05) was found, with the hybrid genotype AG surpassing the AA genotype, reaching 51.67 grams in week 2. Research has focused on genotype variations in OCX-32 and their association with egg quality traits across various chicken population(Nguyen et al., 2018), and research on OCX-32 genotype variations in Iraqi chickens has shown that these polymorphisms can affect egg production traits, with specific findings affecting weekly egg weight rates(AL-Jaryan et al., 2021).

Table 3. The Effect of the ovocalyxin-32 (A22385462>G) genotypes for Iraqi local chickens Hens on the weekly egg weight rate (mean ± SE).

Periods	Genotypes			Significance Level
	AA	AG	GG	
Week1	43.15±3.98	46.93±1.16	48.64±0.91	N.S
Week2	45.88±2.95^{b}	51.67±0.81^{a}	50.36±0.74^{ab}	*
Week3	44.05±3.24^{b}	50.80±0.67^{a}	51.26±0.69^{a}	**
Week4	44.58±0.89^{b}	50.53±0.71^{a}	51.59±0.69^{a}	**
Week5	46.75±2.25	51.01±0.72	51.37±0.53	N.S
Week6	50.17±1.99	49.21±1.76	51.34±0.56	N.S
Week7	50.96±2.33	49.21±1.76	50.96±0.59	N.S
Week8	47.96±2.59	50.14±0.74	50.16±0.67	N.S
Week9	49.04±2.81	51.37±0.74	51.29±0.50	N.S
Week10	51.25±2.94	51.03±0.74	51.93±0.68	N.S
Week11	48.58±3.41	50.66±0.63	52.07±0.59	N.S
Week12	52.67±1.45	50.30±1.35	51.92±0.62	N.S
Week13	50.00±1.68	51.33±0.69	51.77±0.47	N.S
Week 14 +2 day	50.00±1.68	51.33±0.69	51.77±0.47	N.S
Total	48.22±1.40	51.22±0.10	51.17±0.42	N.S

***: Means with different letter within each row, **: Means with different letter within each row highly significant different, N.S: Non-significant**

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Effect of A22385462>G genotypes on Egg Production Traits in Iraqi Local Chickens: As in table (4) illustrates the impact of different genotypes of the A22385462>G gene on weekly egg masses during the productive period. No significant differences were observed in the effect of the A22385462>G genotype on the mean weekly egg mass and the total egg mass rate between the AA, AG, and GG genotypes throughout the productive period. While these findings do not specifically address weekly egg mass, they suggest that OCX-32 genotypes can affect various aspects of egg production and quality, which could collectively influence egg mass over the productive period(Rosalinda et al., 2025). OCX-32 has been associated with various egg production and quality traits in chickens. However, the search results did not directly mention weekly egg masses(Yacoub et al., 2024).

Table 4. Effect of ovocalyxin-32 gene (A22385462>G) genotypes of Iraqi local chickens hens on weekly egg mass (mean ± SE).

Periods	Genotypes			Significance Level
	AA	AG	GG	
Week1	97.55±14.76	107.76±9.37	20.180±7.90	N.S
Week2	166.88±52.40	160.11±15.89	172.10±13.60	N.S
Week3	166.45±26.13	173.15±13.08	205.68±12.21	N.S
Week4	188.91±19.10	199.08±13.72	224.74±13.87	N.S
Week5	246.00±19.20	182.82±15.89	211.08±14.00	N.S
Week6	273.51±19.18	176.04±17.68	212.76±16.00	N.S
Week7	126.75±67.28	148.47±59.70	111.73±10.10	N.S
Week8	201.24±74.61	180.66±18.52	208.88±16.00	N.S
Week9	276.88±39.91	242.88±19.93	248.15±15.49	N.S
Week10	303.75±49.57	224.31±20.69	268.40±17.82	N.S
Week11	298.43±51.00	182.63±18.10	230.60±19.26	N.S
Week12	252.59±49.81	259.02±18.34	255.73±18.67	N.S
Week13	250.00±43.28	194.34±17.91	184.86±16.66	N.S
Week14 + 2day	346.75±57.01	294.52±17.41	291.37±21.81	N.S
Total	3195.68±426.23	2725.77±157.02	2935.21±132.47	N.S

N.S: Non-significant

Influence of A22385462>G and OCX-32 gene genotypes on weekly egg number: Table (5) presents the impact of varying genetic compositions of the A22385462>G gene on the weekly egg production rate throughout the laying period. There was no significant effect of the different genetic compositions (AA, AG, and GG) of the A22385462>G gene on the weekly egg number rate, total feed consumption rate throughout the production period, and total egg number rate. There are a few relevant findings related to the effect of OCX-32 gene genotypes on egg production in Iraqi local chickens, and studies on Iraqi local chickens reported significant associations between OCX-32 genotypes and egg number (EN) ($P \leq 0.05$) . The study concluded that OCX-32 could be used as a potential marker for marker-assisted selection programs to improve egg production in Iraqi chickens(Khalil et al., 2021; Yadav et al., 2016; Zhang et al., 2015).

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Table 5. Effect of ovocalyxin-32 gene (A22385462>G) genotypes of Iraqi local chickens Hens on the weekly egg number (mean ± SE).

Periods	Genotypes			Significance Level
	AA	AG	GG	
Week1	2.25±0.25	2.25±0.18	2.21±0.15	N.S
Week2	3.50±0.96	3.91±0.22	3.96±0.19	N.S
Week3	3.75±0.48	3.98±0.19	4.26±0.16	N.S
Week4	4.25±0.48	4.18±0.23	4.67±0.21	N.S
Week5	5.25±0.25	4.00±0.22	4.50±0.20	N.S
Week6	5.50±0.50	4.09±0.26	4.59±0.24	N.S
Week7	3.75±1.03	2.81±0.24	2.82±0.21	N.S
Week8	5.25±0.48	4.43±0.24	4.63±0.21	N.S
Week9	5.75±0.94	5.41±0.21	5.07±0.26	N.S
Week10	6.00±1.00	4.98±0.29	5.57±0.23	N.S
Week11	6.00±0.71	4.30±0.25	4.73±0.32	N.S
Week12	4.75±0.85	5.36±0.28	5.26±0.28	N.S
Week13	5.00±0.81	4.30±0.27	4.23±1.24	N.S
Week14+ 2day	6.00±1.22	5.91±0.26	5.93±0.34	N.S
Total	67.00±5.31	59.91±1.58	62.46±1.38	N.S

N.S: Non-significant

Impact of OCX-32 SNP on sexual maturity traits in Iraqi local chickens: Table (6) illustrates the impact of the genotypes of the A22385462>G gene on the age and body weight of local female Iraqi chickens at sexual maturity. The Table presents the effect of different genotypes (AA, AG, GG) of the OCX-32 gene (A22385462>G) on the age and body weight at sexual maturity in Iraqi local chicken hens. indicate that the age at sexual maturity did not show significant differences among the genotypes. However, body weight at sexual maturity exhibited statistically significant differences ($p \leq 0.05$), with the hybrid genotype AG showing the highest weight (1438.30 g), outperformed the dominant genotype AA. These results suggest that while OCX-32 gene polymorphism does not influence the age at sexual maturity, it significantly affects body weight at this developmental stage in Iraqi local chickens. This aligns with the study by (Fulton et al., 2012), which highlighted the significant effects of early and late egg weights in two or three types of chickens. Consequently, there are some positive influences of the OCX-32 gene on these traits and, more broadly, on the average egg weight and its content. These findings suggest a potential link between the OCX-32 genotypes and sexual maturation in chickens(Bai et al., 2019; Li et al., 2013).

Table 6. Effect of genotypes of the ovocalyxin-32 gene (A22385462>G) gene on age and body weight at sexual maturity Iraqi local chickens hens (mean ± SE).

Traits	Genotypes			Significance Level
	AA	AG	GG	
Age maturity (days)	149.75±2.95	157.74±4.77	162.39±2.58	N.S
Weight at sexual maturity	1127.50±31.72^{b}	1438.30±40.74^{a}	1417.24±31.05^{a}	*

***: Means with different letter within each row mean significant different, N.S: Non-significant**

Genotypic Influence of A22385462>G gene SNP on egg quality in Iraqi chickens: The results in Table (7), show illustrates the effect of the genotypes of the A22385462>G gene on the qualitative characteristics of eggs produced by local Iraqi female chickens. Table (7) clearly shows that there were no significant differences in the impact of the genotypes.

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Table 7. Effect of ovocalyxin-32 gene (A22385462>G) genotypes of Iraqi local chickens hens on egg quality traits (mean ± SE).

Traits	Genotypes			Significance Level
	AA	AG	GG	
Shell weight/g	6.31±0.31	6.77±0.11	6.70±0.11	N.S
Shell thickness/mm	0.19±0.10	0.25±0.02	0.23±0.02	N.S
Yolk weight/g	15.25±0.60	15.77±0.23	16.43±0.36	N.S
Diameter of yolk/mm	34.08±3.95	34.20±0.96	34.27±1.21	N.S
Height of yolk/mm	16.10±0.72	16.55±0.40	17.19±0.31	N.S
Whiteness Height/mm	5.27±1.04	4.70±0.21	4.71±0.15	N.S
Weight of whiteness/g	29.47±4.30	33.86±0.83	34.15±0.70	N.S
Unit HU	81.00±1.86	82.33±0.69	82.77±0.47	N.S

N.S: Non-significant

CONCLUSION

This study identified notable differences in the distribution of genotypes (AA, AG, and GG) and allele frequencies of the A22385462>G polymorphism in the OCX-32 gene among Iraqi local chickens. The mutant allele G was more frequent than the wild-type allele A was. The GG genotype demonstrated superior feed consumption and egg weight during specific production periods, whereas the AG genotype was associated with higher sexual maturity weight, indicating its potential role in growth and development. This study offers important insights into the OCX-32 gene in Iraqi chickens, further studies are necessary to fully understand its impact on egg production and quality traits. These findings suggest that leveraging genotype information on OCX-32 variants could enhance productivity, while maintaining the unique characteristics of these chickens. Although direct studies of the A22385462>G SNP are limited, broader studies have highlighted its potential significance.

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P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/8307kw57

التغايرات الوراثية الإكسون الخامس والسادس لجين أوفوكاليكسين-32 وتأثيره على الاداء الإنتاجي ونوع البيض للدجاج المحلي العراقي

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المستخلص

أجريت هذه الدراسة لمعرفة التراكيب الوراثية المختلفة لجين الاوفوكلاكسين وتاثيرها في الاداء الانتاجي وبعض الصفات النوعية للبيض في الدجاج المحلي العراقي. استخدم 100 دجاجة محلية بعمر قبل النضج الجنسي ووضعت في اقفاص مرقمة بشكل فردي بواقع دجاجة واحدة لكل قفص. تم جمع الدم لأجراء الفحوصات الجزيئية ابتداء باستخلاص المادة ألوراثية ومن ثم أجراء تفاعل الكوثرة ومن ثم اجراء تحليل التتابعات Sequence بعد اكمال تحليل التتابعات وجد التغاير الوراثي A22385462>G حيث لوحظت فروق ذات دلالة إحصائية عالية (P≤0.01) في النسب المئوية لتوزيع التراكيب الوراثية المختلفة تفوقت التركيبة الوراثية الطافرة GG على التركيبتين الوراثية AG و AA(48.45 و47.42 و 4.2) %على التوالي. كل أسبوع من هذه المدة يتم خلاله دراسة تأثير التراكيب الوراثية في الصفات الانتاجية لهذه الطفرة أظهرت نتائج استهلاك العلف الاسبوعي وجود فروق معنوية لتأثير التراكيب الوراثية المختلفة في A22385462>G إذ تفوق التركيب الوراثي الطافر GG على التركيب الوراثي AAوبلغ(687.57)غم في الاسبوع (11), كما تشير النتائج الى وجود فروق معنوية (P≤0.05)وتفوق التركيب الوراثي الطافر GG على التركيب الوراثي AA في الاسبوعين (12 و13) لصفة استهلاك العلف و بلغ (686.68 و687.96)غم على التوالي وتفوق التركيب الوراثي الهجين AG على التركيب الوراثي AA وبلغ(671.76) غم . في صفة متوسط وزن النضج الجنسي غم وجود فروق معنوي (p<0.05) إذ تفوق التركيب الوراثي الهجين AG على التركيب الوراثي AA وبلغ (30 .1438)غم . كشفت هذه الدراسة عن تأثيرات معنوية لتعدد أشكال هذه الطفرة A22385462>G على الأداء الإنتاجي، ولم تُلاحظ أي فروق معنوية في الصفات النوعية للبيض في الدجاج المحلي.

الكلمات المفتاحية: عمر النضج الجنسي، إنتاج البيض، قشرة البيض، الدجاج المحلي