EFFECT OF DIFFERENT LEVELS OF OLEOBIOTEC® ON PRODUCTION PERFORMANCE AND EGG QUALITY TRAITS IN JAPANESE QUAIL.

Merkhan M. Mustafa
Dept. Of Animal Sci.-Coll. Agric. Engine. Sci. University of Duhok. Iraq
E-mail: merkhan@uod.ac

ABSTRACT

This study was conducted at the Animal |Production Sciences, College of Agricultural Engineering Science, University of Duhok to estimate the effect of different levels of oleobiotec on the production performance, egg quality of Japanese quail. A total of 105 Japanese quail 17 weeks of age obtained from a local farm and distributed into five treatments with three replicate for each one had (7 quail). Different doses of oleobiotec significantly ($P \leq 0.05$) improved egg production, egg weight, and egg mass, fed conversion ratio and egg weight uniformity percentage. Concerning egg haugh unit significantly improved ($P<0.05$) by using oleobiotec while, other egg quality did not influenced with different level of oleobiotec.

Key words: Production performance, Egg quality, improvements egg production

مجلة العلوم الزراعية العراقية -2022 :53(3):578-583 مصطفى

تاثيرمستويات مختلفة من الاوليوبايوتيك على الاداء الانتاجي و مواصفات البيض للسمان الياباني

ميرخان مهدي مصطفى
قسم الانتاج الحيواني-كلية علوم الهندسة الز ا رعية – جامعة دهوك- عراق

المستخلص

اجريت هذة التجربة في حقول قسم الانتاج الحيواني / كلية علوم الهندسه الزراعية/ جامعة دهوك لمعرفة تاثير مستويات مختلفة من مستحضر اوليوبايوتيك على الاداء الانتاجي و مواصفات البيض للسمان الياباني.تم الحصول على 105 سمان بعمر 17 اسبوع من الحقول المحلية و وزعت على خمسة معاملات و ثلاثة مككرات لكل معاملة و سبعة سمان لكل مكرر. مستويات مختلفة من الاليوبايوتك لها تاثير معنوي ($P<0.05$) على زيادة انتاج البيض , وزن البيض, كتلة البيض, كفاءة التحويل الغذائي و نسبة التجانس في وزن البيض. بالنسبة لصفات البيض وحدة هاو تاثرت بشكل معنوي ($P<0.05$) باستعمال مستخلص اوليوبايوتيك وكذلك , مواصفات البيض الاخرى لم تتاثر بمستويات مختلفة من الاوليوبايوتيك.

الكلمات المفتاحية: الاداء الانتاجى, مواصفات البيض , تحسين انتاج البيض

Received:20/2/2021, Accepted:28/4/2021

INTRODUCTION

The demand on ingredients of herbal in people daily life are growing, which is vice-versa will decrease the chemical addictive feed in the diets of poultry which is considered as a priority within the demand of producers. Several countries were added antibiotics to the feed, this affect the animals' profitability negatively (18). The effect of benefit of various compound of bioactive are initiate to poultry production enhancement. The phytogenic term compound means a part from a plant (cinnamon, oregano, coriander, thyme, oregano, rosemary and garlic) especially their extracted essential oil. A lot of valuable properties especially phytogenic compound derived from molecules bioactive (linalool, cineole, carvacrol, thymol, piperine, allylisothiocynate, allicin, capsaicin and anethole) (11). Several researches have been published on the activities of phytobiotic in the nutrition of poultry such as coccidiostatic, antimicrobial, anthelmintic, immune stimulation and Stimulation of feed consumption (18), digestive enzyme enhancement (16), positively effects on the feed conversion and performance ratio, functions of antioxidant and antibacterial (24). Nowadays, the quail rearing has obtained an important role in the poultry production industry. Meat and egg consumption of quail has been raised and the healthy quail production is the demand of the consumer. The essential oil benefits on nutrition of animal include immune response activation, endogenous digestive enzyme secretion improvement and stimulation of appetite (5; 14; 15). There is some other essential oils as well as act as an anti-heat stress (10; 17). Many researches had revealed that the essential oils of herbs contain antibacterial activities especially in the digestive system of broiler (20; 25). This act is getting a greater attention, in particular broiler chickens (1; 2). The supplement dietary of essential oil considerably maximize the improved feed conversion and egg production comparing to the control (6). On the other hand, there is a digestibility ileal of phosphorus, crude fat, crude protein, crude ash and calcium revealed a linear rise in relate to the phytogenic addictive feed in the diet increase. Otherwise, the study on the hens that laying found the supplement diet with essential oil mixture of rosemary, sage and thyme (3) and mixture of essential oil improved eggshell quality, performance and immune response of laying hens (4). The essential oil mixture supplement also affected the eggshell thickness, egg mass and egg weight positively (22). In contrary, also study showed that various levels essential oil dietary had no effect on the egg shell weight, performance parameters and damaged eggs (21). However, (12) reported that the plant extract and essential oil as an additive phytogenic feed had a considerable effect on the laying quail performance; egg production and egg number per hen. Therefore the aim of this study in to investigate the effect of different dose of liquid oleobiotec® (contain carvecarol, clove essential oil, thymol, oregano) on laying quail performance

MATERIALS AND METHODS

The present study was carried out at the poultry farm of Department of Animal Production, College of Agricultural Engineering Sciences, University of Duhok. 105 with 17 weeks old laying quails were randomly distributed to five treatments with three replicates for each one (7 quail). First treatment served as a control and other treatments received 30ppm, 40ppm, 50ppm, 60ppm of (Oleobiotec® Phode. France) in drinking water for an experimental period of 5 weeks. Quails were feed commercial ration containing 22% crude protein and 3000 kcal energy and feed 25g of ration for each quail/day. Egg number and individual egg weight were recorded daily for calculating egg production %, average egg weight, egg mass, FCR and uniformity percentage of egg weight. At the end of each week, 3 eggs from each replicate were chosen randomly for estimating egg quality traits.

Statistical analysis

All results were statistically analyzed by General Linear Models (GLM), one-way analysis of variance, using SAS software (23)

$Yij = \mu + Ti + eij$

Where: Yij = Performance traits measured on the j th traits in the ith treatment.

μ = Overall mean.

Ti = Effect of the treatments (i= 1, 2, 3,..).

eij = Random error effect.

Differences among means were separated using Duncan's multiple range test (10).

RESULTS AND DISCUSSION

Egg production traits:

Figure 1 show the influence of different levels of Oleobiotec® on egg production percentage. All the treated groups were higher than control group during the entire period of study. Treated groups were increased steadily from first week of production until second week. Thereafter, they were decreased sharply until third week and increased again until fourth week of production. Then, they were slightly decreased until the end of the study. Among the treated groups, egg production percentage was higher in T4 during the entire period of study.

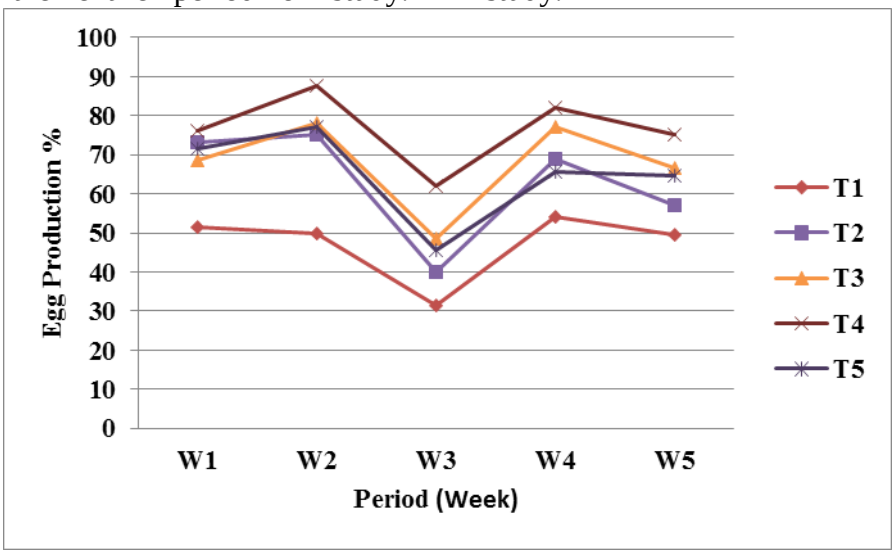

Figure 1. Effect of Oleobiotec® levels on weekly egg production % of Japanese quail.

Production performance:

Data in table 1 shows the effect of Oleobiotec® on hen-day egg production, egg weight, egg mas (g/quail) and feed conversion ratio (g feed/g egg). Data show significant effect of all treatments on the mentioned parameters except egg weight compared to control group. Hen day egg production was significantly higher in all treated groups compared with control group and the highest result was for T4. All used doses had significant effect on the egg mass compared to control group and was highest in T4 among treated groups. Regarding to FCR, T3 and T4 had significant effect compared to other groups. These results were in agree with the findings of Hanafy et al., (12) they found that using different doses of essential oil mixture in drinking water of Japanese quail had significant effect on laying rate and egg mass. Furthermore, Çabuk et al., (7) investigated that using essential oils containing thymol carvecerol and oregano had significant effect on egg production % feed conversion ratio and not affected significantly on egg weight. Additionally, Olgun, (22) was obtained that using essential oils mixture improved egg production, egg mass and feed conversion ratio in laying hens. Moreover, result were in agreements with finding of Manafi et al.,(19) they found that adding phytogenic for quail significantly ($P<0.05$) increased egg production and feed conversion ratio. However, these results was in contrast with finding of Hanafy et al., (12) they found that using essential oil mixture had significant effect on the egg weight. Moreover, Hilmi et al., (13) mentioned that using phytogenic in Japanese quail nutrition had no significant effect on egg production %, egg mass and feed conversion ratio.

Table 1. Effect of Oleobiotec® levels on hen day egg production, egg weight, egg mass and FCR of Japanese quail.

	HDP *	Egg weight(g)	Egg mass g/bird	FCR g/g
Over all	63.89 ±1.72	11.38 ± 0.07	258.47 ± 23.76	3.54 ±0.10
T1	47.28±2.95 c	11.37±0.18 abc	208.35±13.53 c	4.07±0.16 a
T2	62.85±3.58 b	11.75±0.17 a	258.93±17.24 ab	3.69±0.34 ab
T3	67.80±3.03 b	11.64±0.14 ab	276.68±13.85 ab	3.30±0.20 bc
T4	76.57±2.36 a	11.19±0.10 bc	299.98±10.95 a	2.97±0.11 c
T5	64.95±3.08 b	10.95±0.19 c	248.68±14.20 b	3.69±0.22 ab
P value	0.0001	0.0064	0.0004	0.011

***HDP = hen day egg production**

Egg weight uniformity percentage

Results in table 2 show weekly and total egg weight uniformity percentage were significantly affected in almost all the treated groups compared to control group. T4 was significantly affected the weekly and total egg weight uniformity percentage during the entire period of the study. Till now there is no prove how essential oil increase egg weight uniformity this may be due to that essential oil let to increase digestibility of crude protein and crude fat in the ration (9), which lead to provide enough nutrients for eggs formation and make egg weight uniformity higher that control

Table 2. Effect of Oleobiotec® on weekly and total egg weight uniformity[1] % of laying Japanese quail.

	1st week	2nd week	3rd week	4th week	5th week	Total 5 weeks
Mean	38.73 ± 1.78	38.10 ± 1.64	38.25 ± 1.62	38.53 ± 1.6	38.60 ± 2.42	38.44 ± 0.80
T1	27.75 ± 1.20 c	28.83 ± 0.28 b	30.88 ± 0.64 c	32.49 ± 1.74 c	30.68 ± 1.19 b	30.13 ± 0.61 c
T2	38.98 ± 1.93 b	37.96 ± 1.23 a	37.46 ± 0.91 abc	35.15 ± 1.01 bc	37.86 ± 2.86 ab	37.48 ± 0.74 b
T3	39.02 ± 3.35 b	39.22 ± 3.58 a	36.60 ± 1.98 bc	36.49 ± 2.23 bc	40.27 ± 0.69 ab	38.32 ± 1.05 b
T4	46.38 ± 0.84 a	44.07 ± 3.68 a	45.50 ± 3.81 a	48.44 ± 1.98 a	48.21 ± 1.58 a	46.52 ±1.09 a
T5	41.54 ± 0.8 ab	40.40 ± 1.50 a	40.82 ± 3.82 ab	40.09 ± 0.54 b	36.01 ± 10.5 ab	39.77 ± 1.99 b
P value	0.0006	0.015	0.029	0.0004	0.23	0.0001

[1]= Percentage of eggs with ± 5% of mean egg weight.

Egg quality traits.

Results in table 3 show influence of various levels of Oleobiotec® on egg quality characteristics. All the studied parameters were not significantly affected in the exception to Haugh unit, in which it was significantly affected in treated groups compared to control group and it was recorded highest in T4 being 90.72. results were in agree with finding of Olgun, (22) who found that using essential oils mixture not affect significantly on the egg shell percentage. Moreover, Hilmi et al., (13) found using phytogenic in quail ration had no significant effect on albumen weight, albumen % yolk weight, yolk%, while had significant effect on Haugh Unit. Additionally, Çabuk et al., (7) investigated that using mixture of essential oils not affected significantly on shell and yolk weight of Japanese quail eggs. On other hand results were in contrast with findings of Hilmi et al., (13) they investigated that phytogenic had significant effect on shell weight and shell % of quail eggs. Furthermore, Çabuk et al., (7) obtained that mixture of essential oils have no significant effect on Haugh unit of Japanese quail eggs.

Table 3. Effect of Oleobiotec® doses on egg quality characteristics of Japanese quail.

	Mean	T1 (control)	T2 (30ppm)	T3(40ppm)	T4(50ppm)	T5(60ppm)	P values
Egg weight (g)	**12.40 ± 0.10**	**12.35± 0.10**	**12.77 ± 0.16**	**12.56 ± 0.27**	**12.08 ± 0.37**	**12.23 ±0.10**	**0.26**
Albumen weight(g)	**4.99 ± 0.12**	**4.50 ± 0.53**	**5.14 ± 0.21**	**5.20 ± 0.17**	**4.82 ± 0.06**	**5.27 ±0.15**	**0.28**
Shell weight (g)	**1.90 ± 0.05**	**1.92 ± 0.13**	**1.97 ± 0.18**	**1.91 ± 0.18**	**1.87 ± 0.04**	**1.85± 0.05**	**0.97**
Yolk weight	**4.73 ± 0.06**	**4.62 ± 0.12**	**4.66 ± 0.09**	**4.72 ± 0.17**	**4.84 ± 0.14**	**4.84 ±0.20**	**0.77**
Albumen %	**40.34 ± 1.05**	**36.56 ± 4.37**	**40.33 ± 1.76**	**41.52 ± 1.39**	**40.11 ± 1.11**	**43.20 ± 1.53**	**0.39**
Shell %	**15.40 ± 0.44**	**15.58 ± 1.05**	**15.46 ± 1.42**	**15.29 ± 1.47**	**15.54 ± 0.42**	**15.13 ± 0.44**	**0.99**
Yolk%	**38.26 ± 0.55**	**37.43 ± 1.13**	**36.55 ± 0.64**	**37.54 ± 0.88**	**40.21 ± 1.56**	**39.56 ± 1.42**	**0.17**
Albumen high (mm)	**4.47 ± 0.10**	**4.53 ± 0.38**	**4.33 ± 0.23**	**4.36 ± 0.21**	**4.53 ± 0.09**	**4.59 ± 0.19**	**0.91**
HU	**87.92 ± 0.57**	**84.58 ± 1.29 [b]**	**87.78 ± 1.36 [a]**	**88.14 ± 1.1[a]**	**90.72 ± 0.72 [a]**	**88.36 ± 0.62 [a]**	**0.010**

CONCLUSION

In conclusion supplement adding 50- 60 ppm oleobiotec in drinking water of layer quails could improve egg production, egg weight, egg mass, feed conversion ratio and egg weight uniformity percentage.

REFERENCES

1. Alcicek, A., M. Bozkurt, and M. Cabuk. 2003. The effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance, South African Journal of Animal Sciences, 33 (2): 89–94.

2. Alcicek, A., M. Bozkurt, and M. Cabuk. 2004. The effect of a mixture of herbal essential oils, an organic acid or a probiotic on broiler performance," South African Journal of Animal Sciences, 34, (4): 217–222.

3. Amad, A. A., K. Männer, K. R. Wendler, K. Neumann, and J. Zentek. 2011. Effects of a phytogenic feed additive on growth performance and ileal nutrient digestibility in broiler chickens." Poultry Science 90, (12) : 2811-2816.

4. Bolukbasi, S. C. 2008. The effect of feeding thyme, sage and rosemary oil on laying hen performance, cholesterol and some proteins ratio of egg yolk and *Escherichia coli* count in feces." Archives fur Geflugelkunde 72 : 231-237.

5. Botsoglou, N., P. Florou-Paneri, E. Botsoglou, V. Dotas, I. Giannenas, A. Koidis, and P. Mitrakos. 2005. The effect of feeding rosemary, oregano, saffron and α-tocopheryl acetate on hen performance and oxidative stability of eggs. South African Journal of Animal Science 35,(3) : 143-151.

6. Çabuk, M., M. Bozkurt, A. H. M. E. T. Alcicek, A. U. Çatlı, and K. H. Baser. 2006. Effect of a dietary essential oil mixture on performance of laying hens in the summer season. South African Journal of Animal Science 36,(4): 215-221.

7. Çabuk, M., S., Eratak, A., Alçicek, and M., Bozkurt. 2014. Effects of herbal essential oil mixture as a dietary supplement on egg production in quail. The Scientific World Journal, 4.

8. Ding, X., Y., Yu, Z. Su, and Zhang, K., 2017. Effects of essential oils on performance, egg quality, nutrient digestibility and yolk fatty acid profile in laying hens. Animal Nutrition, 3, (2):127-131.

9. Duncan, D.B., 1955. Multiple ranges and multiple F. test. Biometric. 11:42

10. Fengtlua, L., X.-Z. Q, S.-C. Long, Q.-Z. Pıng, and L.-C. Hua. 1998. Study of anti-heat stress effect of some Chinese medicinal herbs, Chinese Journal of Animal Science, 34, 28–30.

11. Grashorn, M. A. 2010. Use of phytobiotics in broiler nutrition – an alternative to in feed antibiotics J. Anim. Feed Sci. 19:338- 347.

12. Hanafy, A.M., H.A. Khalil, Omnia E. Kilany, Marwa A. Hassan, Mohamed S. Yusuf, Abdelazim Ibrahim, I.M. Fares, A.M. Hassan and P.G. Reddy.2015. Efficacy of oil mixture supplementation on Productive and physiological changes of laying japanese quail (*Coturnix coturnix japonica*). Asian Journal of Animal and Veterinary Advances. 11(1):24-33.

13. Hilmi, M., sumiati , and D.A., Astuti. 2015. Egg production and physical quality in cortunix cortunix japonica fed diet containing piperine as phytogenic feed additive. Media peternakan, 38, (3):150-155.

14. Jamroz, D., J. Orda, C. Kamel, A. Wiliczkiewicz, T. Wertelecki, and J. Skorupi´nska, .2003. The influence of phytogenic extracts on performance, nutrient digestibility, carcass characteristics, and gut

microbial status in broiler chickens, Journal of Animal and Feed Sciences, 12, (3): 583–596.

15. Jamroz, D., A.,Wiliczkiewicz, T.,Wertelecki, J., Orda, and J., Skorupi ´nska. 2005. Use of active substances of plant origin in chicken diets based on maize and locally grown cereals, British Poultry Science, 46, (4): 485–493.

16. Jamroz, D., T. Wertelecki, M. Houszka, and C. Kamel. 2006. Influence of diet type on the inclusion of plant origin active substances on morphological and histochemical characteristics of the stomach and jejunum walls in chicken. Journal of Animal Physiology and Animal Nutrition, 90(5- 6), 255-268.

17. Ma, D., A., Shan, Z. Chen, , J. Du, K. SongLi,. and Q. Xu. 2005. Effect of ligustrum lucidum and schisandra chinensis on the egg production, antioxidant status and immunity of laying hens during heat stress. Archives of Animal Nutrition, 59,(6) :439-447.

18. Manafi, M. 2015. Comparison study of a natural non-antibiotic growth promoter and a commercial probiotic on growth performance, immune response and biochemical parameters of broiler chicks. J. Poult. Sci. 52:274-281.

19. Manafi, M., M., Hedayati, and S., Khalaji. 2016. Effectiveness of phytogenic feed additive as alternative to bacitracin methylene disalicylate on hematological parameters, intestinal histomorphology and microbial population and production performance of japanese quails. Asian-Australasian Journal of Animal Sciences, 29, (9):1300.

20. Manzanilla, E. G., J. F. Perez, M. Martin, C. Kamel, F. Baucells, and J. Gasa. 2004. Effect of plant extracts and formic acid on the intestinal equilibrium of early-weaned pigs," Journal of Animal Science, 82, (11): 3210–3218.

21. Olgun, O. and A.Ö., Yıldız. 2014. Effect of dietary supplementation of essential oils mixture on performance, eggshell quality, hatchability, and mineral excretion in quail breeders. Environmental Science and Pollution Research, 21,(23):13434-13439.

22. Olgun, O., 2016. The effect of dietary essential oil mixture supplementation on performance, egg quality and bone characteristics in laying hens. Annals of Animal Science, 16(4), 1115.

23. SAS institute., 2002. Sas User's Guide : Statistics Version 6th ed. Sas institute, inc., cary, nc.

24. Windisch, W., K. Schedle, C. Plitzner, and A. Kroismayr. 2008. Use of phytogenic products as feed additives for swine and poultry. J. Anim. Sci. 86:140-148.

25. Zhou, F., B. Ji, H. Zhang, H. Jiang, Z. Yang, J.Li, Y. Ren, and W. Yan. 2007. Synergistic effect of thymol and carvacrol combined with chelators and organic acids against Salmonella Typhimurium. Journal of food protection 70, (7): 1704-1709.