Zagazig J. Agric. Res., Vol. 48 No. (6) 2021 1401-1409

Animal, Poultry and Fish Production Research

Available online at http://zjar.journals.ekb.eg

http:/www.journals.zu.edu.eg/journalDisplay.aspx?Journalld=1&queryType=Master

EFFECT OF DIETARY YEAST EXTRACT SUPPLEMENTATION ON SOME CARCASS AND BLOOD TRAITS OF GROWING JAPANESE QUAIL REARED UNDER HIGH STOCKING DENSITY

Rasha M. Sabry*, A.M. El-Maghawry and F.M. Reda

Poult. Dept., Fac. Agric., Zagazig Univ., Egypt

Received: 24/11/2021 ; Accepted: 30/11/2021

ABSTRACT: This work was designed to study the effects of stocking density (SD) without or with yeast extract (YE) supplementation on carcass traits and some blood biochemical parameters of growing Japanese quail. A total number of 340, 7-days old unsexed Japanese quail chicks with initial body weight of 30.42 g were used in this study. The quails were randomly distributed to 6 experimental groups (4 replicates/group) in a complete randomized design. The 1st group was reared in normal density (ND; 10 birds/replicate) and fed the basal diet without any supplementation; the 2nd, 3rd, 4th, 5th and 6th groups were reared in high density (HD; 15 birds/replicate) and fed the basal diet supplemented with 0, 1, 2, 3 and 4 mg YE/ kg diet, respectively. The treatment with 1 mg YE / kg diet of groups stocked at HD resulted significantly increased in the relative weight of liver, gizzard and giblets comparable with either HD or untreated group kept at HD. Total protein and albumin values were significantly increased by dietary YE supplementation of HD groups compared with ND and HD without dietary YE supplementation. It is worth to note that, quail chicks groups housed at ND have increase A/G % compared with the groups housed at HD with or without YE supplementation. Increasing SD without or with dietary YE supplementation at different levels had significantly ($p<.0001$) increased plasma alanine aminotransferase (ALT) and aspartate aminotransferase (AST) concentrations compared with the chicks stocked in ND. However, there were no significant differences were observed among all experimental groups due to increasing density without or with dietary YE supplementation on kidney functions (plasma creatinine and urea levels). From the obtained results it could be concluded that dietary supplementation of YE can positively attenuate the stress applied upon growing quail reared under HD through enhancing some carcass traits, liver and kidney functions.

Key words: Quail, yeast extract, carcass, biochemical profile.

INTRODUCTION

Japanese quail is considered one of the important alternative resources of animal protein, because it have many advantages such as fast growth, early sexual maturity, short incubation period, small size and high egg production, low feed requirements and its housing costs, less floor space compared with the different species of poultry (**Padmakumar *et al.,* 2000**). Also, quails are widely distributed in many countries of the world (**Roshdy *et al.,* 2010; El-Tarabany *et al.,* 2015**).

Stocking density (SD) influences animals' welfare but lowering it without guaranteed optimal environmental conditions is of minor importance (**Jones *et al.,* 2005; Utnik-Banaś *et al.,* 2014**). The best housing condition for rearing poultry are of great interest to researchers, and good production conditions are essential to promote poultry production and improve welfare and profit (**Lewko and Gornowicz, 2011; Mesa *et al.,* 2017**). Housing conditions can also affect animal welfare and mortality of laying hens (**Weimer *et al.,* 2019; Schuck-Paim *et al.,* 2021**).

* **Corresponding author: Tel. :**+201012151593
E-mail address: gelanar@yahoo.com

The target of the quail producers is to increase the stocking density (SD) to achieve further reductions in production costs, but an excessive crowding of chickens can decrease performance and welfare of chickens kept in cages (**Hassanein, 2011; Tayeb *et al.*, 2011; Utnik-Banaś *et al.*, 2014**). To this regard, no clear recommendations are available in the literature on optimal space allowance for quail raising.

Stocking stress associated with increasing animal density can be relieved by using feed additives with strong antioxidant property **(Attia *et al.*, 2021)**.

Japanese quails are recently attracted attention in the poultry sector for being economically viable (**Bolacali and Irak, 2017**). The development of intensive poultry industry has made the role of feed additives in poultry diets more and more important. The proper use of feed additives can increase feed utilization, improve production and promote health. Thus, probiotics like yeast (*Saccharomyces cerevisiae*; *SC*) have been investigated as a feed additive for improve animal performance and health (**Ogbuewu *et al.*, 2018**). Probiotics are live microorganisms that improve animals' health by competing with undesirable microorganisms, improve intestinal microbial balance and absorption of nutrients (**Al-Khalaifah, 2018**). *SC* is considered as one of the most yeast species that are added to dietary formulations in poultry diets (**Duarte *et al.*, 2012**). *SC* contain substantial levels of digestible proteins, vitamins, magnesium, zinc and its wall have many characteristics such as polysaccharides α-D-mannan, chitin and β-D-glucan (**Elghandour *et al.*, 2019**) which play an important role in microbial balance in intestine towards beneficial organisms. Furthermore, proliferation of tissues in intestine and lymphocytes with a rapid cell turnover depend mostly on dietary nucleotides where de novo synthesis of nucleotides cannot meet their demand (**Alizadeh *et al.*, 2016**).

This work was designed to study the effects of stocking density (SD) without or with yeast extract supplementation on the performance carcass traits, liver and kidney functions of growing Japanese quail.

MATERIALS AND METHODS

The present study was carried out at Poultry Research Farm, Poultry Department, Faculty of Agriculture, Zagazig University, Egypt.

This work was designed to study the effects of stocking density (SD) without or with yeast extract supplementation on carcass traits and some blood biochemical parameters (total protein and its fractions, liver and kidney functions) of growing Japanese quail.

Experimental Birds and Management

A total number of 340, 7-days old unsexed growing Japanese quail chicks with initial body weight of 30.42 g were used in this study. The quails were randomly distributed to 6 experimental groups and 4 replicates maintained per each group in a complete randomized design. The 1st group (40 quails) was stocked at a rate of 10 chicks/replicate (control, ND) and fed the basal diet without any supplementation; the 2nd, 3rd, 4th, 5th and 6th (HD; 60 quails/group) stocked at a rate of 15 chicks/replicate and fed the basal diet supplemented with 0, 1, 2, 3 and 4 mg yeast extract/ kg diet, respectively.

Birds were weighed, and randomly housed in cages. House temperature was kept at about 30°C during the first week, then gradually decreased by 2°C weekly until reached 24°C and kept until the end of the experimental period. In all the experimental groups, birds were subjected to 23 hours light at intensity of 3 watt/m^2 along the experimental period which extended to the age of 5 weeks, feed and water were available *ad libitum* throughout the experimental period.

Experimental Diets

The basal experimental diets were formulated to cover the nutrient requirements of growing Japanese quail as recommended by **NRC (1994)**. The composition and calculated composition of the experimental basal diets are presented in Table 1.

Measurements Investigated

Caracas traits

At the end of the experimental period, four birds from each group were randomly selected

Table 1. Composition and calculated analysis of the experimental basal diet

Items	(%)
Ingredient	
Yellow Corn (8.5%)	51.80
Soybean meal (44%)	36.70
Gluten meal (62%)	5.21
Soybean oil	2.90
Limestone	0.70
Di-calcium phosphate	1.65
Salt	0.30
Premix[1]	0.30
L-Lysine	0.13
Dl-Methionine	0.11
Choline chloride (50%)	0.20
Total	100.00
Calculated composition[2] (%)	
ME, Kcal /Kg	2995
Crude protein	24.00
Calcium	0.80
Nonphytate P	0.45
Lysine	1.30
Total sulfur amino acids (M+CY)	0.92

1. Provides per kg of diet: Vitamin A, 12,000 I.U; Vitamin D3, 5000 I.U; Vitamin E, 130.0 mg; Vitamin K3, 3.605 mg; Vitamin B1 (thiamin), 3.0 mg; Vitamin B2 (riboflavin), 8.0 mg; Vitamin B6, 4.950 mg; Vitamin B12, 17.0 mg; Niacin, 60.0 mg; D-Biotin, 200.0 mg; Calcium D-pantothenate, 18.333 mg; Folic acid, 2.083 mg; manganese, 100.0 mg; iron, 80.0 mg; zinc, 80.0 mg; copper, 8.0 mg; iodine, 2.0 mg; cobalt, 500.0 mg; and selenium, 150.0 mg.
2. Calculated according to **NRC** (**1994**).

around the average of body weight, fasted overnight and weighed then slaughtered by a sharp knife to complete bleeding then followed by plucking the feather and the total inedible parts were removed. The liver, gizzard and heart were separately and individually weighted, then, the remaining carcass was weight to determine the dressing weight (Dressed weight = carcass weight plus giblets weight).

The percentage of carcass, giblets (liver, heart and empty gizzard) and dressing weights to live body weight were calculated.

Blood biochemical parameters

Individual blood samples were collected into EDTA tubes from 4 birds within each treatment (on individual basis) at 5 weeks of age. Each blood sample was centrifuged at 4000 rpm for 15 minutes to separate blood plasma.

The colorimetric determination of total protein level was carried out by specific diagnostic kit according to **Armstrong and Carr (1964)** with principle that in the presence of alkaline cupric sulfate the protein produced a violet color, the intensity of which is proportion to their concentrations.

The colorimetric determination of albumin was carried out by specific diagnostic kit produced by Bio-ADWIC according to **Wise (1965)** an albumin/bromo cresol-green complex is formed at pH 4.2 and the complex is measured photometrically.

Albumin concentrations were subtracted from the total protein concentrations to obtain the globulin concentrations (g/dl).

Plasma creatinine as (mg/dl) was determined according to **Henry (1974**) aminotransferase (ALT) and aspartate aminotransferase (AST) as (U/L) in using commercial kit (Diamond Diagnostics kits). The activity of alanine plasma were assayed by the method of **Reitman and Frankel (1957)** using commercial kits (Diamond Diagnostics kits).

Statistical Analysis

The differences among treatments were statistically analyzed by one- way ANOVA using the SAS General Linear Models Procedure **(SAS. 2002)** by adopting the following model:

$$X_{ij} = \mu + T_i + e_{ij}$$

Where:

X_{ij} = An observation

μ = Overall mean

T_i = Effect of treatment (i = 1, 2, …… and 6).

e_{ij} = The experimental random error.

The significant differences between treatment means were separated by Duncan's Multiple Range-test (**Duncan, 1955**). All percentages were converted to the corresponding arcsine prior to statistical analysis.

RESULTS AND DISSCUTION

Carcass Traits

From the results presented in Table 2, it was clear that, the relative weight of carcass, heart and dressing did not differ significantly among all experimental groups. However, the relative weight of liver, gizzard and giblets were significantly (P=0.0029, 0.0001 and 0.0155, respectively) influenced by treatments. It was mentioned that, the treatment with 0.1 mg YE/ kg diet of groups stocked at HD resulted significantly increased in the relative weight of liver, gizzard and giblets comparable with either group kept at HD or untreated group kept at HD.

Several investigators found that, there were no significant differences in the relative weight of carcass yields of broilers and quail chickens with increasing stocking density (**Boontian *et al*., 2019; Cengiz *et al*., 2015; Vargas- Rodriguez *et al*., 2013**). The results of effect dietary YE supplementation on carcass traits studied in the present study are in line with **Ahmed *et al*., (2015**) who found that dietary yeast (SC) diet not have any significant effect on hot and cold carcass percentages. On the other hand, some authors found significant improvements in carcass yield of broiler chicks due to dietary yeast culture supplementation (**Fathi *et al*., 2012; Onwurah and Okejim, 2014; Novake *et al*., 2011**).

Blood Constituents

Total protein and its fractions

Results presented in Table 3 show that, increasing stocking density (SD) from ND to HD without addition YE in their diet had no significant effect on total protein (TP) and albumin (ALB) values. However, increase in TP (P=0.0066) and ALB (P<.0001) values were observed by dietary YE supplementation of HD groups compared with ND and HD without dietary YE supplementation. It is worth to note that, quail chicks groups housed at ND have increase A/G ratio (P=0.003) compared with the groups housed at HD with or without YE supplementation. This study has been confirmed an inverse relation between the stocking density (SD) and globulin concentration where, HD groups fed diet without or with YE supplementation had recorded numerically lower globulin concentration compared to the ND group.

Contradicting results were obtained by **El-Tarabany (2016)** who found that in quail layers, the group kept at low SD (200 cm^2/bird) had significantly highest TP and ALB concentrations in comparison with the group kept at HD (143 cm^2 / bird). Likewise they found the highest A/G ratio has been recorded in LSD group, while the lowest value was in the HSD group.

Table 2. Carcass traits of growing Japanese quail as affected by stocking density without or with yeast extract supplementation

Items	ND	HD	HD + Yeast extract level (mg/kg diet)				SEM	*P* value
			1	2	3	4		
Carcass %	73.1	72.72	73.98	73.32	74.69	74.99	1.253	0.8475
Liver %	2.50^{bc}	2.19^{c}	3.12^{a}	2.93^{ab}	2.22^{c}	2.39^{c}	0.118	0.0029
Gizzard %	2.04^{b}	2.17^{b}	2.70^{a}	2.22^{b}	2.57^{a}	2.48^{a}	0.061	0.0001
Heart %	0.88	0.8	0.73	0.73	0.86	0.87	0.035	0.0534
Giblets %	5.43^{b}	5.16^{b}	6.55^{a}	5.87^{ab}	5.65^{b}	5.74^{b}	0.177	0.0155
Dressing %	78.53	77.89	80.53	79.18	80.34	80.74	1.341	0.7190

Means within the same row with different common superscripts differ significantly.

Table 3. Total protein and its fractions of growing Japanese quail as affected by stocking density without or with yeast extract supplementation

Items	ND	HD	HD + Yeast extract level (mg/kg diet)				SEM	*P* value
			1	2	3	4		
TP (g/dL)	2.57^{bc}	2.23^{c}	2.97^{a}	2.62^{ab}	2.94^{ab}	2.78^{ab}	0.113	0.0066
ALB (g/dL)	1.32^{c}	1.30^{c}	1.70^{a}	1.47^{b}	1.82^{a}	1.71^{a}	0.037	<.0001
GLOB (g/dL)	1.25	0.93	1.27	1.15	1.13	1.07	0.077	0.0846
A/G ratio	1.05^{d}	1.42^{abc}	1.35^{bc}	1.28^{cd}	1.64^{a}	1.60^{ab}	0.075	0.0030

Means within the same row with different common superscripts differ significantly.
TP: total protein; Alb: albumin, GLOB: globulin; A/G: albumin/ globulin ratio.

Our results are in line with **Paryard and Mahmoudi (2008)** who observed that findings yeast supplementation led to significantly higher serum TP content comparison to feeding unsupplemented yeast in broiler chicks. In reverse to these findings **Ghally and Abd Elatif (2007)** and **Ahmed *et al.* (2015)** noticed that dietary yeast supplementation in quail and broiler chicks causes decrease in serum albumin contents. Also, **Pouraziz *et al*. (2013)** and **Koncea *et al*. (2009)** assured that, no significant difference were observed in serum TP concentrations as a result of supplement of yeast to quail and broiler diets.

Liver and kidney functions

In the present study, increasing the stocking density (SD) from ND to HD without or with dietary YE supplementation at different levels had significantly (p<.0001) increased plasma AST and ALT concentrations compared with the chicks stocked in ND (Table 4). However, there were no significant differences were observed among all experimental groups due to increasing density (SD) without or with dietary YE supplementation on kidney functions (serum creatinine and urea levels).

The increased serum AST and ALT activity in birds stocked under HD indelicate that, high stocking density (SD) might cause oxidative lesions which are in accordance with the findings of **Simsek *et al*. (2009)**. Similarly **Shewita *et al*. (2019)** showed that, high stocking density (SD) altered the activity of liver functions enzymes (AST and ALT). On the other hand, **Bontiam *et al*. (2019)** did not find any significant effect of stocking density (SD) on blood profile (AST and uric acid). Also, **Al-Hamad (2020)** found that, there were no significant differences between the densities in AST and ALT concentrations due to high density.

Table 4. Liver and kidney functions of growing Japanese quail as affected by stocking density without or with yeast extract supplementation

Items	ND	HD	HD + Yeast extract level (mg/kg diet)				SEM	*P* value
			1	2	3	4		
Liver functions								
AST (IU/L)	7.19^{c}	15.95^{a}	10.67^{b}	6.32^{c}	15.17^{a}	16.25^{a}	0.873	<.0001
ALT (IU/L)	144.05^{c}	201.65^{a}	137.05^{c}	143.15^{c}	211.25^{a}	170.50^{b}	5.932	<.0001
LDH (IU/L)	182.15^{b}	192.50^{b}	235.50^{a}	124.50^{c}	193.50^{b}	181.65^{b}	9.709	0.0004
Kidney functions								
Creatinine (mg/dL)	0.55	0.64	0.57	0.50	0.51	0.53	0.037	0.2616
Urea (mg/dL)	4.64^{a}	5.38^{a}	4.31^{a}	2.70^{b}	4.53^{a}	4.71^{a}	0.490	0.0458

Means within the same row with different common superscripts differ significantly.
AST: aspartate aminotransferase and ALT: alanine aminotransferase.

The obtained results of effect of dietary YE supplementation in HD diet in the present study agree with **Abd El-Azeem and Hamid (2006)** who obtained insignificant decrease in, albumin, A/G ratio and creatinine in the plasma by adding yeast in the broiler diets. There was an increase in plasma globulin in the yeast group. Significant differences were observed in plasma TP and liver enzymes activity (ALT and AST) due to dietary barley yeast condition. On the other hand, obtained results of effect dietary YE supplementation in HD diet in the present study disagree with several authors (**Abd EL-Wahab *et al*, 2019** and **Shareef and Al- Dabbagh, 2009)** who observed, the activities of ALT and AST in quails, and broilers serum were not affected by dietary yeast supplementation. However, our results agree with the results obtained by (**Yalcin *et al.*, 2008**).

Conclusion

From the data obtained in the present study it could be concluded that dietary supplementation of YE can positively attenuate the stress applied upon growing quail reared under HD through enhancing some carcass traits, liver and kidney functions.

REFERENCES

Abd El-Azeem, F. and A.A. Hamid (2006). Using barley with yeast culture saupplementation in broiler diets. Egypt. Poult. Sci., 26:179-206

Abd El-Wahab, A., R. Mahmoud, B. Marghani and H. Gadallah (2019). Effects of Yeast Addition to the Diet of Japanese Quails on Growth Performance, Selected Serum Parameters and Intestinal Morphology as well as Pathogens Reduction. Pak. Vet. J., 40 (2): 219-223.

Ahmed, M.E., T.E. Abbas, M.A. Abdlhag and D.E. Mukhtar (2015). Effect of dietary yeast (*Saccharomyces cerevisiae*) supplementation on performance, carcass characteristics and some metabolic responses of broilers. Anim. Vet. Sci., 3:5–10

Al-Hamed, A.M.Y. (2020). Effect of density and different levels of green tea on productive performance, and some blood biochemical parameters of quail. Mesopotamia J. Agric., 48 : 1.

Alizadeh, M., J.C. Rodriguez-Lecompte and A. Yitbarek (2016). Effect of yeast-derived products on systemic innate immune response of broiler chickens following a lipopolysaccharide challenge. Poult Sci., 95 : 2266-73.

Al-Khalaifah, H.S. (2018). Benefits of probiotics and/or prebiotics for antibiotic-reduced poultry. Poult. Sci., 97: 3807-15.

Armstrong, W.D. and C.W. Carr (1964). Physiological chemistry laboratory direction. 3rd *E. Burses* publishing Co. MN, USA, Minneopollis.

Attia, Y.A., F. Bovera, A.E. Abd El-Hamid, M.A. Mandour, M. Al-Harthi S.A. and Hassan (2021). Effect of Housing Density, Dietary Vitamin E and/or Chromium Chloride on Laying Performance, Egg Quality, Reproductive Traits, and Welfare Status of Japanese Quail Hens. JKAU: Met., Env. and Arid Land Agric. Sci., 30 (1): 1 – 9.

Bolacali, M. and K. Irak (2017). Effect of dietary yeast autolysate on performance, slaughter, and carcass characteristics, as well as blood parameters, in quail of both genders. S. Afr. J. Anim. Sci., 47:460-70.

Boontian, W., S. Sangsoponjit and A. Klompanya (2019). Effects of Dietary Crude Protein Level and Stocking Density on Growth Performance, Nutrient Retention, Blood Profiles, and Carcass Weight of Growing-Meat Quails. Iran. J. Appl. Anim. Sci., 9 (4): 755-762.

Cengiz, O., B.H. Koksal, O. Tatlı, O. Sevim, U. Ahsan, A.G. Uner, P.A. Devrim, B.S. Buyukyoruk, A. Yakan and A.G. Onol (2015). Effect of dietary probiotic and high stocking density on the performance, carcass yield, gut microflora, and stress indicators of broilers. Poult. Sci., 94: 2395–2403.

Duarte, K.M., L.H. Gomes and A.C. Sampaio (2012). Saccharomyces cerevisiae used as probiotic: Strains characterization and cell viability. J Anim. Vet. Sci., 1:17-9.

Duncan, D.B. (1955). Multiple Range and Multiple F Tests. Biomet., 11: 1-42.

Elghandour, M.M.Y., Z.L. Tan and S.H. Abu Hafsa (2019). Saccharomyces cerevisiae as a probiotic feed additive to non and pseudo-ruminant feeding: A Rev. J. Appl. Microbiol. Aug. 19 https://doi.org/10.1111/ jam.14416.

El-Tarabany, M.S. (2016). Impact of cage stocking density on egg laying characteristics and related stress and immunity parameters of Japanese quails in subtropics. J. Anim. Physiol. and Anim. Nutr., 100: 893–901.

El-Tarabany, M.S., T.M. Abdel-Hamid and H.H. Mohammed (2015). Effect of cagestocking density on egg quality traits in Japanese quail. Kafkas Univ. Vet. Fak. Derg., 21(1): 13-18.

Fathi, M.M., S. Al-Mansour, A. Al-Homidan, A. Al-Khalf and M. Al-Damegh (2012). Effect of yeast culture supplementation on carcass yield and humoral immune response of broiler chicks. Vet. World, 5 (11): 651-657.

Ghally, K.A. and S.A. Abd El-Latif (2007). Effect of dietary yeast on some productive and physiological aspects of growing Japanese quails. Afr. Crop Sci. Conf. Proc., 8: 2147–2151.

Hassanein, H.H.M. (2011). Growth performance and carcass yield of broilers as affected by stocking density and enzymatic growth promoters. Asian J. Poult. Sci., 5:94-101.

Henry, R.F. (1974). clinical chemistry principles and Technics, 2nd Ed., Harper and Row, Hagerstein, MD.

Jones, T.A., C.A. Donnelly and M.S. Dawkins (2005). Environmental and management factors affecting the welfare of chickens on commercial farms in the United Kingdom and Denmark stocked at five densities. Poult. Sci., 84:1155-1165.

Koncea, Y., F. Kirkpinar, S. Mert and B. Kayhan (2009). Performance, intestinal microflora and blood constituents in finishing turkeys fed diets supplemented with dietary mannan oligosaccharide and live yeast. J. Anim. Feed Sci., 18: 508-517.

Lewko, L. and E. Gornowicz (2011). Effect of housing system on egg quality in laying hens. Ann. An. Sci., 11: 607-616.

Mesa, D., E. Correa Muniz, A. Souza and B. Geffroy (2017). Broiler-housing conditions affect the performance. Rev. Bras. Ciê. Avíc., 19 (2): 263-272.

Novak, R., B. Bogoviˇc Matijaˇsi´c, D. Terˇciˇc, M. Cervek, ˇG. Gorjanc, A. Holcman, A. Levart and I. Rogelj (2011). Effects of two probiotic additives containing Bacillus spores on carcass characteristics, blood lipids and cecal volatile fatty acids in meat type chickens. J. Anim. Physiol. Anim. Nutr., 95: 424–433.

NRC (1994). National research council nutrient requirements of poultry. 9th Ed. Nat. Acad. Press, Washington. DC.

Ogbuewu, I.P., V.M. Okoro and E.F. Mbajiorgu (2018). Yeast (*Saccharomyces cerevisiae*) and its effect on production indices of livestock and poultry-a review. Comp Clin Pathol., 28: 669-77.

Onwurah, F.B. and J.C. Okejim (2014). Effect of graded levels of Baker's yeast (*Saccharomyces cerevisiae*) in water on carcass and organ characteristics of broiler chickens. Acad. Res. Int., 5:128–133.

Padmakumar, B., N.G. Reghunanthan, A. Ramakrishnan, A.K.K. Unni and N. Ravindranathan (2000). Effect of floor density on production performance of Japanese quails reared in cages and deep litter. J. Vet. An. Sci., 31: 37-39.

Paryard, A. and M. Mahmoudi (2008). Effect of different levels of supplemental yeast on performance, blood constituents and carcass characteristics of broiler chicks. Afr. J. Agric. Res., 3 (12): 835-842.

Pouraziz, S., H.A. Shahryar and S. Chekani-Azar (2013). Effects of dietary Saccharomyces cerevisiae and butyric acid glycerides on performance and serum lipid level of broiler chickens. Kafkas. Univ. Vet. Fak. Derg., 19: 903-907.

Reitman, S. and S. Frankel (1957). Colorimetric methods for aspartate and alanine aminotransferase. Am. J. Clin. Pathol., 28: 55 - 60.

Roshdy, M., H.A. Khalil, A.M. Hanafy and M.E. Mady (2010). Production and reproduction traits of Japanese quail as affected by two housing system. Egypt. Poult. Sci. J., 30 (I): 55-67.

SAS (2002). SAS/STAT User's Guide: Release 9.03 ed. SAS Inst. Inc., Cary, NC.

Schuck-Paim, C., E. Negro-Calduch and W.J. Alonso (2021). Laying hen mortality in different indoor housing systems: a meta-analysis of data from commercial farms in 16 countries. Sci. Rep., 11:30-52. https://doi.org/10.1038/s41598-021-81868-3

Shareef, A.M. and A.S.A. Al-Dabbagh, (2009). Effect of probiotic (*Saccharomyces cerevisiae*) on performance of broiler chicks. Iraqi J. Vet. Sci., Vol. 23, Supplement I: 23-29.

Shewita, R., K. El-Naggar and W. Abd El Naby (2019). Influence of dietary vitamin C supplementation on growth performance, blood biochemical parameters and transcript levels of heat shock proteins in high stocking density reared broiler chickens. Slovenian Vet. Res., 56:129–38.

Simsek, U.G., B. Dalkilic, M. Ciftci, I.H. Cerci and M. Bahsi (2009). Effects of enriched housing design on broiler performance, welfare, chicken meat composition and serum cholesterol. Acta. Vet. Brno., 78:67-74.

Tayeb, I.T., S.N. Hassan, M.M. Mustafa, S.A.M. Sadeq, G.I. Ameen and A.M. Hassan (2011). Effects of various stocking density on productive performance and some physiological traits of broiler chicks. Res. Opin. An. Vet. Sci., 2: 89-93.

Utnik-Banaś, K., J. Żmija and E. Sowula-Skrzyńska (2014). Economic aspects of reducing stocking density in broiler chicken production using the example of farms in southern Poland. Ann. An. Sci., 14: 663-671.

Vargas-Rodr´ıguez, L.M., L.A. Dur´an-Mel´endez, J.A. Garc´ıaMas´ıas, J.L. Arcos-Garc´ıa, B.M. Joaqu´ın-Torres and M.G. Ruelas-Inzunza (2013). Effect of probiotic and population density on the growth performance and carcass characteristics in broiler chickens. Int. J. Poult. Sci., 12: 390–395.

Weimer, S.L., C.I. Robison, R.J. Tempelman, D.R. Jones and D.M. Karcher (2019). Laying hen production and welfare in enriched colony cages at different stocking densities. Poult. Sci., 98 (9): 3578-3586 DOI: 10.3382/ps/ pez107.

Wise, W.A. (1965). Determination of serum albumen. King Waschr. 43:273.

Yalcin, S., F. Oguz, B. Guçlu and S. Yalcın (2008). Effects of dietary dried baker's yeast on the performance, egg traits and blood parameters in laying quails. Trop Anim. Health Prod., 41: 5–10.

تأثير إضافة مستخلص الخميرة للعليقة على بعض صفات الذبيحة والدم للسمان اليابانى النامي المربى بكثافة مرتفعة

رشا محمد صبرى- أحمد مجدى المغاورى- فايز محمد رضا

قسم الدواجن – كلية الزراعة – جامعة الزقازيق - مصر

صممت هذه التجربة لدراسة تأثير الكثافة المرتفعة بدون أو بإضافة مستخلص الخميرة للعليقةعلى صفات الذبيحة وبعض قياسات الدم. تم استخدام 340 طائر سمان عمر 7أيام غير بمتوسط وزن جسم 30.42جم. تم توزيع السمان عشوائيا إلى 6مجموعات تجريبية بكل مجموعة 4مكررات فى تصميم عشوائى تام .المجموعة الأولى 40طائر تم تسكينها بمعدل 10طيور/مكررة (كنترول ذات كثافة طبيعية). وتم تغذيتها على عليقة إساسية بدون إضافات. المجموعات 2، 3، 4، 5، 6 سكنت بكثافة مرتفعة بمعدل 15طائر/مكررة وغذيت على عليقة قاعدية مع إضافة 0، 1، 2، 3، 4. ملجم مستخلص خميرة/كجم علف على التوالى. سجلت الطيور المسكنة بكثافة عالية ومغذاه على عليقة مضاف لها 1ملجم مستخلص خميرة/ كجم علف زيادة فى وزن الكبد والقانصة الأجزاء المأكولة مقارنة بمجموعة الكثافة الطبيعية أو الكثافة المرتفعة وغير معاملة بمستخلص الخميرة. تأثرت قيم البروتين الكلى والألبومين معنويا بمجموعات الكثافة المرتفعة مع مستخلص الخميرة مقارنة بمجموعة الكثافة الطبيعية أو الكثافة المرتفعة بدون إضافات. ارتفعت نسبة A/G فى مجموعات الكثافة الطبيعية عن مجموعات الكثافة المرتفعة بدون أو إضافة مستخلص الخميرة. أدت زيادة الكثافة بدون أو مع إضافة مستخلص الخميرة للعليقة إلى زيادة تركيز ALT، AST فى البلازما بالمقارنة بمجموعات الكثافة الطبيعية. لا يوجد أى تأثير معنوى ملحوظ خلال التجربة بزيادة الكثافة أو بإضافة مستخلص الخميرة على وظائف الكلى والكبد. ومن النتائج المتحصل عليها يمكن ان نستنتج ان إضافة مستخلص الخميرة للعليقة يمكن ان يخفف بشكل ايجابي من تأثير الكثافة المرتفعة في السمان من خلال تحسين بعض صفات الذبيحة وتعزيز وظائف الكلى والكبد.

المحكمـــون :

1 - أ.د.

2- أ.د.