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EFFECTS OF EARLY HEAT STRESS ON SOME PHYSIOLOGICAL AND IMMUNOLOGICAL PARAMETERS IN TWO LOCAL STRAINS OF CHICKENS

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ABSTRACT

A total number of 500 two weeks old sexed chicks from each strain (Inshas and Matrouh) were used to study the effects of early heat stress on productive performance and some physiological and immunological traits. The chicks were divided randomly into five equal experimental groups (100 chicks for each group, 50 male and 50 female chicks). The first group didn't received any treatment and served as control, The second group was exposed to early (6 weeks of age) heat stress without any anti - stress, The third group received the same treatment as the second group with anti -stress, The fourth was exposed to both early (6 weeks of age) and late (12 weeks of age) heat exposure, without anti-stress, The last group received the same treatment as fourth group with anti- stress. The heat stress was for 4 hours / day for 5 consecutive days at 38- 40°c inside the house and the anti-stress was vitamin C (Ascorbic acid) where it was added at level of 3 gm (20% concentration) / liter drinking water during one day before heat exposure until the end of the treatment.

The obtained results could be summarized as following:

1- Body weight after treatment for Matrouh was higher significantly (P≤0.05) than Inshas. The heat exposure affect body weight but the effect was not clear.

2- At 12 weeks of age the treated group that received vitamin C (Treatment3 and 5) were higher significantly (P≤0.05) than other treated group and control.

3- Body weight gain (at 6 weeks of age) in Matrouh strain was higher significantly (P≤0.05) than Inshas .It take the same trend as body weight. With regard the sex the male body weight gain was higher than female for both strains.

4- At 8 weeks of age, body weight gain was higher in vit. C treated group than others (T3 compared with Treatment1, 2,3,4,5). The same trend was observed at 12 weeks of age.

5- Early heat exposure either with anti stress or not decreased body weight gain significantly (P≤0.05) than other treatments and control.

6- Growth rate was higher significantly (P≤0.05) in male chicks than female at 4,8,12 ages. Also, Inshas strain has higher growth rate than Matrouh strain at all ages.

7- With regard to humoral Plasma total protein, albumin, globulin, glucose, there are no significant difference at 6and 12 weeks of ages. The differences between sexes and strains are not significant (P≤0.05).

8- With regard to humoral immune response against ND and SRBC's the differences between strains or sexes are not significant (P≤0.05).

9- The group received early and late heat stress with anti - stress (vit. C) has the best value for humoral immunity against ND.

10- Geometric mean value for Antibody production showed the same trend, group 5 (received early and late heat stress with anti stress Vit. C) has Large value for both strain and two sexes than the other groups and control.

Keywords: Local chicken, humoral immune response, cell mediated immunity, hormones, heat stress anti-stress (vit C).

INTRODUCTION

The decline in poultry production is generally due to high temperature conditions in hot climate regions. High environmental temperature has deleterious effect on growth and production performance of poultry . This negative effects of heat stress on growth rate and production performance is probably primarily due to reduced feed intake for laying hens Savory,(1986). Hyperventilation or "panting" increases during periods of high environmental temperature. Heat loss through evaporative cooling allows the broiler to dissipate the heat it is generating. However, panting requires increased muscle activity and this results in an increased energy requirement, which is associated with heat stress. Many investigators studied the effect of heat stress in poultry and they found that reduction in body weight and weight gain resulting exposed the chicks to high ambient temperature. Hamed (2005), Mohamed(2004), Kalamah *et al.*, (2002), El-tantawy *et al.*, (1998), Bonnet *et al.*, (1997), Ain Baziz *at al.*, Yahav *et al.* (1997), Osman, (1996), and Hurwitz,(1980). Hyperventilation "Panting" is one of the visible responses of poultry during exposure to heat by evaporative cooling at the surfaces of the mouth, and respiratory passageways Wiernusz and Teeter, (1995). Belay and Teeter, (1993), Beers *et al.*, (1989). And Bottje and Harrison,(1985)., Vitamin C is perhaps the most studied nutrient in relation to ambient temperature, Where Vit C. increasing feed metabolism and feed utilization, in addition to improving calcium metabolism and absorption.Many investigators reported that as Pardue *et al.* (1985a.b), Cafantaris, (1990). Stillborn *et al.* (1988), Cheng *et al.*(1990), Cier *et al.* (1992), Sahota *et al.* (1994), Abd-Ellah, (1995), Hamdy *et al.*(1995), Homidan (2000), Atta,(2002), Kalamah et *al.* (2002), Soliman, (2003).

MATERIALS AND METHODS

(1) Genetic stock and Management:

A total number of 500 two - week old sexed chicks from each strain " Inshas and Matrouh " was used in this experiment. in each strain The chicks were reared on ground pens with deep litter under natural day light. All chicks were feed ad libitum on starter ration from "1-6" weeks of age, grower ration from "7-12" weeks of age, and layer pre- production ration from "13-19" weeks these rations contain (19.1 %cp and 2850 Kcal /ME), (16% cp and 2800 Kcal /ME) and (17.1% cp and 2760 Kcal/ ME) respectively standard management practices were adapted similarly for all chicks during the experimental period. shown in table (1) presented the chemical analysis of these rations according to NRC,(1994)

(2) Experimental design " treatments":

The chicks of each strain were divided randomly into five groups "100 chicks for each group, each group contains 50 male and 50 female". The first group didn't received any treatment and served as control, The second group was exposed to early (4 weeks of age) heat stress without any anti –heat stress, The third group received the same treatment as the second group with anti -stress, The fourth was exposed to both early (6 weeks of age) and

late (12 weeks of age) heat exposure, without anti-stress, The last fifth group received the same treatment as fourth group with anti- stress.

* The heat stress was exposure the chicks to 38-40C° for 4 hours daily for 5 days. Anti-stress vitamin C (Ascorbic acid) was added at level of 3 gm (20% concentration) / liter drinking water during one day before heat exposure until the end of the treatment.

(3) Studied traits:

(a) Growth performance

Monthly body weight (BW), body weight gain (BWG), and growth rate (GR) were measured, and mortality was recorded and mortality rate (MR) was monthly calculated.

(b) Blood picture:

At "6 and 12 weeks" of age three blood samples were taken from each sex within each strain treatment from each strain for measuring hematocrite percent (HT%) and hemoglobin concentration (Hb) g/dl.

(c) Plasma constituents:

At "6 and 12 weeks" of age three blood sample from each sex/ treatment/ strain were taken from brachial vein in hebraized tubes and centrifuged at 3000 rpm for 10 minutes to obtain the plasma and stored at -20°C until the analysis. The plasma samples were used in the analysis to measure total protein (TP) according to Gornall et al., (1949), Albumin (Alb) according to Doumas, et al., (1971), Globulin (Glo), Gloucose (Glu) according to Trinder (1969) and liver function (AST, ALT) according to Reitman and Frankel (1957).

(4) Immunological parameters:

4-1 Humaral immune response (antibody titer):

In this experiment, we used two indicators were used to measure the humoral immunity or) antibody production). We measured the humoral immune response by both ND vaccine and SRBC's injection as shown below:

(a) Against ND vaccine:

We used the procedures reported by Atta(1993).

(b) Against SRBC's:

We used the procedure that reported by El-Kaiaty (1993).

4-2 Cell- mediated immunity (CMI):

The response to phytohemaggiutinin (PHA) injection as indicator of cell mediated immunity was measured by injection 50 µ of PHA (dissolved in 0.1 ml of saline) subcutaneously into a defined area on the right wattle of 3 chicks of each sex of each strain of each treatment. The same amount of saline (0.1 ml) was injected in the opposite (left) wattle and served as control. The thickness of both wattle were measured before and 24 h after PHA injection by a caliper (cotter and Weinner, 1997), (El-Kaiaty, 1993). * The response to PHA injection was calculated as a ratio that described by (Bachman and Mashaly, 1987) as follows: -

%Wattle thickness increasing = (After PHA/After Saline) According to Sturkie. (1986),

Statistical analysis: -

The Data were statistically analyzed using the two way analysis of variance using the general linear models (GLM) Statistical analysis (SAS) software package (1999).

$$Y_{ijk} = \mu + S_i + T_j + G_k + ST_{ij} + SG_{ik} + TG_{jk} + STG_{ijk} + e_{ijk}$$

Where:

Y_{ijk}: observation
S_i: the effect of i^{th} strain (i= 1,2).
T_j: the effect of j^{th} treatment (j=1,2,3,4,5).
G_k: the effect of k^{th} sex (k=1,2,).
ST_{ij}: interaction of j^{th} treatment and the i^{th} strain.
SG_{ik}: interaction of i^{th} strain and the k^{th} sex.
TG_{jk}: interaction of i^{th} strain, j^{th} treatment and k^{th} sex.
STG_{ijk}: interaction of i^{th} strain, j^{th} treatment and k^{th} sex.
e_{ijk}: residual random effect.

The significant of differences between means were tested by Duncan's multiple range tests, (1955).

RESULTS AND DISCUSSION

(1) Effect of Heat Stress on performance

1-Body weight and weight gain

Result in table (2) showed that (Matrouh) strain had higher significant body weight than the (Inshas) strain and the male had higher significantly body weight than the female Additives Vit C improved both body weight and weight gain values, as compared with the control , The results of this study agree with those of cier et al.(1992) who reported that, adding ascorbic acid to broiler diets improved growth of both males and females. Kassim and Norziha (1995); Hamdy et al.(1995); Mohamed (1997); Homidan (2000); and Ibrahim and Mobarak (2000) confirmed the role of Vit.C. In this respect, Kalamah et al. (2002) explained that improvement of body weight of the broiler fed diets containing vitamin C was due to that that vitamin C induces change in metabolism of bired reared under heat stress by decreasing plasma coriticosterone which tends to improve growth performance of the bird.Thaxton and Paudue (1984) revealed that vitamin C supplementation, during heat stress may reduce glucocorticoiid levels, resulting in less tissue degradation, allowing chicks to gain more weight following the heat stress. It appears that the supplemented levels vitamin C in the present study were sufficient enough to alleviate the deleterious effect of high ambient temperature on BWG of broilers during the 4 weeks of age as the birds become older and heavier, the can net withstand the narrow range of temperature flections imposed during the finisher period. It is worth noting, however, that earlier investigations by Deaton, et al., (1972 and 1984)indicated that with cyclic temperatures in the 10 to 14 C range, performance is improved the temperature fluctuations in the present study were 28.3 to 35.4; 27.9 to 34.9 and 28 to 34.7 C during the 4 ,5,6 week of age, respectively. FurthermoreTeeter,et al., (1985); and Ait- Boulahsen, et al ., (1995) reported that the best BWG was obtained with broilers receiving

25.3 gm NaHCO3 and 6-9 gm Kcl or similar salts in feed or water during high ambient temperatures. These levels were higher than those used in the present study which may explain the non significant effect of these salts on BWG. The improvement occurred in BWG for the vit C supplemented group was in agrrmrnt with the recent results by Mekee and Harrision(1995), Although Stilborn et al., (1988) found no beneficial effects for vit C supplemention.the improvement in body weight and weight gain due to addition of the A.A this is may be due to the role of Ascorbic Acid in food metabolism and increase the food utilization especilly effect in calcium metabolism and absorption. It is generally assumed that Ascorbic Acid is involved in calcium metabolism which might be mediated either by enhancing intestinal ca absorption or re- absorption of bone to release Ca ions .

3-Effect of Heat stress on Plasma Total protein and Albumin

As shown in table (3,4) there were no significant differences obtained between the two strains (Inshas) and (Matrouh) in the over all mean of total protein , Albumin and globulin during the experimental period. In the anther study Plasma TP was lower for the control compared with the treated groups, the salt- treated chickens have the highest TP value .A similar trend was also observed between strains, where TP for Lohman chicks were higher than those of Arbor Acres one. Although these differences were statistically not significant they show a possible effect of ambient temperature and treatment on plasma TP . this result agree with Squibb, et al., (1959) .However, many investigations, confirm the results of the present study, that they observe slight decreases in plasma TP in heat –stressed chickens (Deaton,et al., 1969; Faltas, et al., 1987; and Berrong and Wassburn,(1998).

4-Effect of Heat stress on Plasma Glucose

As shown in table (5) there were no significant differences obtained between the two strains (Inshas) and (Matrouh) in the over all mean of Glucose during the experimental period these results are suggestive of elevated plasma concentrations of glucocorticoids that may in crease catabolism of protein and fatty tissue thriugh gluconeogenesis The observed hyperglycemia attributed to heat stress in present study, however, is in disagreement with studies in mammalian species the authors attributed the decline in blood glucose concentration during heat stress to a decrease in concentration of thyroxin, which is closely associated with energy metabolism during heat stress exposure.

5- Effect of Heat stress on immune

As shown in table (7,8) there were no significant differences obtained between the two strains (Inshas) and (Mtrouh) in the over all mean of immunity The effect of robotic (Protexin) supplementation on antibodies titers against Newcastle Disease vaccination (lasota strain) for growing New Zealand White rabbits after two months of treatments is summarized Results showed that the means of antibody titers of NZW rabbits against Newcastle Disease Vaccination (ND) ranged between 1.0 to 4.0 after two months of treatment. There was a significant increase ($p \leq 0.05$) in antibody titer production by the supplementation of Protexin than the control group. The highest value of antibody titer production was 4.0 by adding either 2.5 or 5.0

g Protexin/ Litter of drinking water. These results indicated that the antibody production increased gradually and significantly with increasing the supplementation of Protexin. These results are in agreement with findings of Wade et. al., (1984), Fuller (1989), Maria et. al., (1999), Perdigon et. al., (1994).

Cell Mediated Immunity (CMI)

As shown in table(9) The effect of probiotic (Protexin) supplementation on lymphocyte T- cell activity (stimulation) as indicated by ear thickness (% increase in ear thickness) This was considered as an indication of cell-mediated immunity (CMI) 12 and 24 hours post PHA (Phytohemagglutinin) injection in growing New Zealand White rabbits after two months of treatment. The cell mediated immunity can be determined by Phytohemagglutinin (PHA) skin test, The ear thickness reaction to Phytohemagglutinin (PHA) of NZW rabbits ranged between 1.82% to 12.26% after 12 hour and between 4.55% to 27.4% after 24hour of injection. Results showed increase in ear thickness reaction to Phytohemagglutinin (PHA) injection by supplementation of Protexin than the control group. The highest increase in ear thickness was 12.26% which was obtained from the 2.5g Protexin/ Litter of drinking water after 12 hour of injection, While, thehighest increase in ear thickness (27.4%) was obtained by adding 5.0g Protexin/Litter of drinking water after 24 hour from injection. The lowest increase in ear thickness was 1.82% and 4.55% in the control group after 12 and 24 hours of injection, respectively. Results indicated that the ear thickness reaction to Phytohemagglutinin (PHA) injection increased gradually with increasing the dose of Protexin.

Table (1): composition and calculated analysis of experimental diets.

Ingredients	Layer diets		
	Starter	Grower	Production
Yellow corn	62.20	65.50	65.50
Soybean meal (44%)	18.00	8.00	15.50
Layer concentrates (50%)	10.00	10.00	10.00
Wheat bran	9.00	16.00	1.00
Bone meal	0.40	----	0.50
Limestone	0.40	0.50	7.50
Total	100.00	100.00	100.00
Calculated analysis:			
Cp%	19.00	16.50	17.70
ME / Kcal / kg	2850	2840	2800
Ca%	1.04	0.95	3.75
Avi. P%	0.44	0.40	0.42
Lys.%	0.98	0.74	0.87
Meth.%	0.41	0.37	0.83
TSAA%	0.83`	0.74	0.77

Layer concentrates analysis: 50% CP. 2500 ME, 7% Ca, 2.5% avi.p, 2.5% Lys., I.5% Meth. And 1.5% TSAA.

Table (2): Effect of heat stress (Mean ± SE) on Body weight (12 weeks) in two local strain of chickens

Treatments	strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	788.08 ± 20.94 ^{cd}	668.46 ± 20.91 ^{f}	878.31 ± 19.15 ^{ab}	675.98 ± 26.29 ^{f}	752.71 ± 10.91 ^{CD}
Exposed H.S early	677.66 ± 23.34 ^{f}	554.71 ± 19.55 ^{g}	694.95 ± 23.70 ^{ef}	582.95 ± 22.04 ^{g}	627.57 ± 11.11 ^{E}
Exposed H.S+A.A	869.96 ± 21.75 ^{ab}	754.35 ± 25.34 ^{cde}	921.86 ±24.48 ^{a}	713.25 ± 26.81 ^{ef}	814.86 ± 12.33 ^{A}
Exposed H.S early &late	879.10 ± 21.20 ^{ab}	703.74 ± 20.21 ^{ef}	854.53 ± 19.35 ^{ab}	705.92 ± 21.20 ^{ef}	785.82 ± 10.25 ^{BC}
Exposed H.S early &late+A.A	816.74 ± 22.04 ^{bc}	717.17 ± 20.21 ^{ef}	913.16 ± 22.34 ^{a}	705.71 ± 24.08 ^{ef}	788.19 ± 11.10 ^{BC}
Sex * Strains	803.53 ± 8.27 ^{B}	682.68 ± 7.93 ^{C}	864.63 ± 8.10 ^{A}	697.24 ± 8.86 ^{C}	
Breed overall mean	Inshas		Matrouh		
	743.11± 5.73 ^{B}		780.94 ± 6.00 ^{A}		
Sex overall mean	Male		Female		
	834.08 ± 5.78 ^{a}		689.96 ± 5.94 ^{b}		

a.b,c,d,e,f,g means within the same row and column with different superscripts are differ significantly (P≤0.05)

Table (3) Effect of heat stress (Mean±SE) on Albumin concentration in blood 'mg/dl' (12 weeks old) in two local strain of chickens

Treatments	Strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	1.55±0.47^{ab}	1.36±0.38^{b}	1.54±0.38^{ab}	1.33±0.47^{b}	1.44±0.20^{B}
Exposed Heat stress early	2.79±0.38^{a}	2.10±0.38^{ab}	1.78±0.38^{ab}	2.18±0.38^{ab}	2.21±0.19^{A}
Exposed heat stress + A.A	1.64±0.38^{ab}	1.66±0.38^{ab}	1.59±0.47^{ab}	2.22±0.38^{ab}	1.78±0.19^{AB}
Exposed heat stress early and late	2.35±0.38^{ab}	1.99±0.38^{ab}	1.50±0.38^{ab}	2.61±0.38^{ab}	2.11±0.19^{A}
Exposed heat stress early + late + A.A	2.19±0.38^{ab}	1.71±0.38^{ab}	1.48±0.38^{ab}	1.43±0.38^{ab}	1.70±019^{AB}
Sex * Strains	2.14±0.17^{A}	1.76±0.17^{AB}	1.57±0.17^{B}	2.00±0.17^{AB}	
Breed overall mean	Inshas		Matrouh		
	1.93±0.12^{A}		1.77±0.12^{A}		
Sex overall mean	Male		Female		
	1.84±0.12^{a}		1.86±0.12^{a}		

a.b,c,d means within the same row and column with different superscripts are differ significantly (p<0.05) from each other.

A,B,C, means within the same column with different superscripts are differ significantly (p<0.05) from each other.

Table(4): Effect of heat stress (Mean±SE) on Total protein concentration in blood 'mg/dl' (12weeks old) in two local strain of chickens

Treatments	Strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	4.01±0.73^{a}	4.28±0.60^{a}	4.52±0.60^{a}	5.30±0.73^{a}	4.50±0.32^{A}
Exposed Heat stress early	5.39±0.60^{a}	5.19±0.60^{a}	4.59±0.60^{a}	5.03±0.60^{a}	5.05±0.29^{A}
Exposed heat stress + A.A	4.85±0.60^{a}	4.58±0.60^{a}	4.42±0.60^{a}	4.11±0.60^{a}	4.49±0.29^{A}
Exposed heat stress early and late	3.58±0.60^{a}	4.27±0.60^{a}	4.46±0.60^{a}	4.94±0.60^{a}	4.38±0.29^{A}
Exposed heat stress early + late + A.A	5.91±0.60^{a}	3.97±0.60^{a}	3.81±0.60^{a}	4.44±0.60^{a}	4.53±0.29^{A}
Sex* Strains	4.86±0.27^{A}	4.46±0.26^{A}	4.36±0.26^{A}	4.72±0.27^{A}	
Breed overall mean	Inshas		Matrouh		
	4.65±0.19^{A}		4.53±0.19^{A}		
Sex overall mean	Male		Female		
	4.60±0.19^{a}		4.58±0.19^{a}		

a.b,c,d, means within the same row and column with different superscripts are differ significantly (P< 0.05) from each other.
A,B, means within the same column with different superscipts are differ significantly (P< 0.05) from each other.

Table (5): Effect of heat stress (M ± SE) on Glucose concentration in blood 'mg/dl' (6 weeks old) in two local strain of chickens

Treatments	Strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	167.34 ± 30.63^{bc}	123.42 ± 30.63^{c}	204.95 ±37.51^{abc}	224.19 ± 30.63^{abc}	177.38 ± 16.68^{B}
Exposed H.S early	272.30 ± 30.63^{ab}	284.54 ± 30.63^{a}	231.77 ± 30.63^{abc}	237.80 ± 30.63^{ab}	256.60 ± 15.95^{A}
Exposed H.S+A.A	272.59 ± 30.63^{ab}	213.70 ±30.63^{abc}	184.98 ± 37.51^{abc}	208.75 ±53.05^{abc}	226.10 ± 18.60^{A}
Exposed H.S early &late	235.86 ± 30.63^{ab}	254.22 ±30.63^{ab}	288.72 ± 30.63^{a}	253.35 ±30.63^{ab}	258.04 ± 15.95^{A}
Exposed H.S early &late+A.A	221.18 ± 30.63^{abc}	292.51 ±30.63^{a}	219.63 ± 30.63^{abc}	238.19 ± 30.63^{ab}	242.88 ± 15.95^{A}
Sex * Strains	233.85 ± 15.97^{A}	233.68 ± 15.97^{A}	230.79 ± 17.16^{A}	236.10 ± 17.16^{A}	
Breed overall mean	Inshas		Matrouh		
	233.77 ± 10.08^{A}		230.63 ± 10.98^{A}		
Sex overall mean	Male		Female		
	230.14 ± 10.48^{a}		234.26 ± 10.52^{a}		

a.b,c means within the same row and column with different superscripts are differ significantly (P< 0.05) from each other.

Table (6): Effect of heat stress (M±SE) on Newcastle disease (12 weeks) in two local strain of chickens

Treatments	Strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	6.71±0.76^{ab}	4.60±0.90^{abcd}	6.16±0.82^{abc}	6.83±0.82^{ab}	6.07±0.41^{AB}
Exposed Heat stress early	5.25±1.01^{abcd}	5.71±0.76^{abcd}	4.00±0.90^{bcd}	6.20±0.90^{abc}	5.29±0.45^{BC}
Exposed heat stress + A.A	5.66±0.82^{abcd}	0.75±0.76^{e}	4.57±0.76^{bcd}	6.50±0.82^{ab}	4.32±0.39^{DC}
Exposed heat stress early and late	4.000.82^{bcd}	3.25±1.01^{cde}	3.28±0.76^{cdc}	2.71±076de	3.31±0.42^{D}
Exposed heat stress early + late + A.A	6.66±1.38^{A}	4.38±0.39^{B}	4.80±0.38^{AB}	8.00±2.02^{a}	7.11±0.64^{A}
Sex* Strains	5.65±0.38^{A}	4.38±0.39^{B}	4.80±0.38^{AB}	6.04±0.52^{A}	
Breed overall mean	Inshas		Matrouh		
	5.02±0.27^{A}		5.42±0.32^{A}		
Sex overall mean	Male		Female		
	5.23±0.27^{a}		5.21±0.32^{a}		

A.b,c,d,e, means within the same row and column with different superscripts are differ significantly (P< 0.05) from each other

Table (7): Effect of heat stress (M±SE) onSRBC'S (12 weeks) in two local strain of chickens:

Treatments	STrains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	6.00±0.80^{a}	6.80±0.88^{a}	7.25±0.99^{a}	8.16±0.80^{a}	7.05±0.43^{A}
Exposed Heat stress early	7.60±0.88^{a}	6.71±0.74^{a}	5.20±0.88^{a}	7.80±0.88^{a}	6.82±0.42^{A}
Exposed heat stress + A.A	7.50±0.80^{a}	8.14±0.74^{a}	6.85±0.74^{a}	6.66±0.80^{a}	7.29±0.38^{A}
Exposed heat stress early and late	6.75±0.99^{a}	7.66±1.14^{a}	8.16±0.80^{a}	7.83±0.80^{a}	7.60±0.47^{A}
Exposed heat stress early + late + A.A	7.25±0.99^{a}	7.60±0.88^{a}	6.00±1.40^{a}	7.00±1.98^{a}	6.96±0.69^{A}
Sex * Strains	7.02±0.40^{A}	7.38±0.40^{A}	6.69±0.44^{A}	7.49±0.51^{A}	
Breed overall mean	Inshas		Matrouh		
	7.20±0.28^{A}		7.09±0.34^{A}		
Sex overall mean	Male		Female		
	6.85±0.30^{a}		7.43±0.32^{a}		

A.b,c,d,e, means within the same row and column with different superscripts are differ significantly (P<0.05) from each other

The obtained results indicated that Probiotics (Protexin) increased the ear thickness as an indicator of T-Cell-lymphocyte activity. This activity is apparently associated with increasing the dose of Protexin. This is in full agreement with the results reported by Perdigon et. al., (1995) Pestka et. al., (2001), They concluded that cell-mediated immunity is stimulated by the

administration of Probiotics The beneficial effects of Probiotics on the immune system may be mediated by a direct antagonistic effect against specific groups of organisms, resulting in a decrease in their number .or by an effect on their metabolism (Goldin and Gorbach, 1984) or by the stimulation of immunity (Umesb, 1999). Also, it may be due to an antibiotic activity (Fuller, 1988), lactic acid Production (Leesson and Major, 1990) and could prevent enteric infections and stimulate secretory IgA in malnourished animals (Perdigon et. al., 1995).

Table (8): Effect of heat stress (M±SE) on PHA concentration in blood 'mg/dl' (weeks old) in two local strain of chickens

Treatments	Strains				Treatments overall mean
	Inshas		Matrouh		
	Sex		Sex		
	Male	Female	Male	Female	
Control	1.046±0.24^{E}	1.25±0.24^{Ed}	1.066±0.24^{E}	1.96±0.24^{BCD}	1.33±0.14^{B}
Exposed Heat stress early	1.31±0.24^{E}	2.33±0.24^{AB}	1.37±0.24	1.52±0.24^{CD}	1.63±0.14^{B}
Exposed heat stress + A.A	1.49±0.24^{E}	1.61±0.24^{BECD}	1.46±0.24^{Ec}d	2.14±0.24^{BCD}	1.76±0.14^{B}
Exposed heat stress early and late	2.02±024^{B}	3.00±0.24A	1.46±0.24 ^{Ecd}	1.93±0.24^{BCD}	2.10±0.14^{A}
Exposed heat stress early + late + A.A	1.58±0.24^{B}	1.26±0.24^{Ed}	1.96±0.24^{BCD}	1.33±0.24^{Ecd}	1.53±.01^{B}
Sex* Strains	1.49±0.14^{A}	1.89±0.14^{A}	1.46±0.14^{A}	1.78±0.14^{A}	
Breed overall mean	Inshas		Matrouh		
	1.69±0.09^{A}		1.62±0.09^{A}		
Sex overall mean	Male		Female		
	1.47±0.09^{B}		1.83±0.09^{A}		

a,b,c,d, means within the same row and columm with different superscripts are differ significantly (P<05) from each other.

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دراسة تأثير الإجهاد الحراري المبكر علي الصفات الفسيولوجية والمناعية في سلالتين من الدجاج المحلي

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أجريت هذه التجربة بمحطة الدواجن بأنشاص التابعة لقسم بحوث تربية الدواجن بمعهد بحوث الإنتاج الحيواني بوزارة الزراعة .استخدم في هذه التجربة ٥٠٠ كتكوت من السلالات المحلية انشاص ومطروح بهدف دراسة تأثير الإجهاد الحراري المبكر علي الصفات الفسيولوجية والمناعية للطيور وتم تقسيم الطيور عشوائيا قبل النضج الجنسي إلي خمس مجموعات متساوية كآلاتي ١٠٠ كتكوت في كل مجموعة ٥٠ ذكر و ٥٠ أنثى حيث ربيت الكتاكيت تربية ارضي وتم تغذية الكتاكيت تغذية حرة مع اتباع نظام التحصين الوصي به وقد قسمت المجاميع كالأتي :-

المجموعة الأولى : عدم التعرض للإجهاد الحراري (كنترول)

- المجموعة الثانية: تم تعريض الطيور للإجهاد الحراري المبكر علي عمر ٦ أسابيع بدون إضافة أي مضاد للإجهاد الحراري
- المجموعة الثالثة : تم تعريض الطيور للإجهاد الحراري المبكر علي عمر ٦ أسابيع مع إضافة مضاد للإجهاد الحراري(حامض الاسكوربيك)
- المجموعة الرابعة : تم تعريض الطيور للإجهاد الحراري المبكر علي عمر ٦ أسابيع ثم التعرض للإجهاد الحراري المتأخر علي عمر ١٢ أسبوع بدون إضافة أي مضاد للإجهاد الحراري
- المجموعة الخامسة : تم تعريض الطيور للإجهاد الحراري المبكر علي عمر ٦ أسابيع ثم التعرض للإجهاد الحراري المتأخر علي عمر ١٢ أسبوع مع إضافة مضاد للإجهاد الحراري (حامض الاسكوربيك)
- وكانت مدة التعرض للإجهاد الحراري ٤ ساعات لمدة ٥ أيام متتالية علي درجة حرارة ٣٨-٤٠ درجه سليزية وتم إضافة مضاد الإجهاد الحراري (حامض الاسكوربيك) قبل المعاملة بيوم بمعدل ٣ جرام / لتر ماء واستمر حتى نهاية المعاملة .

ملخص النتائج المتحصل عليها:

تأثير الإجهاد الحراري علي وزن الجسم

أوضحت جميع النتائج أن وزن الجسم في سلالة مطروح اكبر من سلالة انشاص في وزن الجسم والزيادة المكتسبة في وزن الجسم مقارنتا بالكنترول وأيضا وزن الذكور كان اكبر من وزن الإناث في جميع المعاملات.

تأثير الإجهاد الحراري علي معدل النمو

معدل نمو الذكور كان اكبر من معدل نمو الإناث في السلالتين علي عمر ١٢،٨،٤، أسبوع وكان معدل نمو سلالة انشاص اكبر من معدل نمو سلالة مطروح.

(٣) تأثير (حامض الاسكوربيك) علي وزن الجسم

أدى إضافة (حامض الاسكوربيك) آلي زيادة المأكول من الغذاء وكذلك آلي تحسن معنوي وزن الجسم مقارنتا بالكنترول .

(٤) تأثير الإجهاد الحراري علي صفات الدم

لم يوجد أي تأثير معنوي في نسبة البروتين الكلي و الالبيومين و الجلوبيولين والجلوكوز بين المعاملات علي عمر ٦و ١٢ اسبوع بينما الاختلاف كان واضح بين السلالتين وايضا بين الجنسين.

(٥) تأثير الإجهاد الحراري علي المناعة

لم يوجد أي تأثير معنوي بين المعاملات في قياس تتر النيوكاسل أو الحقن بخلايا دم الغنم الحمراء بينما الاختلاف كان واضح بين السلالتين وأيضا بين الجنسين.

(٦) تأثير (حامض الاسكوربيك) علي معدل النفوق

أوضحت النتائج انخفاض معدل النفوق في المجموعات المعاملة ب (حامض الأسكوربيك) حيث يعمل (حامض الاسكوربيك) كالمضاد للإجهاد الحراري .