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Influence of Tranquilizer on Meat Production of Fayoumi Pullets Exposed to Thermal Stress

M.A. Kicka, S.A. Riad and G.A.R. Kamar

Faculty of Agriculture, Cairo University, Egypt.

A NUMBER of 750 Fayoumi chicks were divided at hatch into three groups. The first group was brooded under high temperature (90°F) for 12 weeks. The second group was brooded under normal temperature of the routine system (90°-87°-84°..., 65° F). The third group was subjected to colder temperature starting by 85°F in the first week, 75°F in the second week and 65°F in the tenth week. Every group was divided into five subgroups. The subgroups were fed rations containing 0.0, 0.5, 1.0 p.p.m. reserpine, 0.5 and 1.0 ppm hydroxyzine respectively. Body weight, gain weight, feed consumption and feed efficiency were recorded from 0-12 weeks of age. At 12 weeks of age 6 birds from each subgroup were used to estimate eviscerated, edible and moisture percent. Results obtained could be summarized as follows :

1. Rearing the growing chicks under normal environmental temperature for three months improved body weight, gain weight, feed efficiency, eviscerated and edible percent than high and low temperature.
2. Addition of tranquilizers to the ration of the growing chicks improved body weight, gain weight, feed efficiency, eviscerated percent, edible percent and dry matter.
3. High level of tranquilizers had more pronounced effect on carcass quality than low level.
4. Under different temperatures, reserpine was more effective than hydroxyzine.

High environmental temperature produces depressing effect on growth rate, egg production and quality as well as other economically important characters. This depression might be due to increasing body temperature of the fowl, reduction in feed intake, mediated through the thyroid or a combination of other physiological factors.

It is widely known in recent years that using tranquilizer in chickens ration protects them from heat stress (Burger *et al.*, 1957; Huston, 1959 and Weiss, 1959). There was a significant decrease in body temperature of the tranquilizer-treated birds at the high environment temperature.

The importance of adding tranquilizers to the ration of chickens had been reported by many workers. The beneficial effect of tranquilizer in chickens has been indicated by decreased mortality, increasing egg production, increasing egg weight and improved egg quality during heat stress (Gilbreath, 1959; Gilbreath *et al.*, 1959; Eoff *et al.*, 1961 and Kondre *et al.*, 1964).

Effect of tranquilizer agent on growth and meat production was not studied enough. Burger *et al.* (1959) and Kicka (1973) obtained a significant increase in growth of pullets fed lower doses of tranquilizer in the first two months. However, Anderson and Smyth (1960) and Craig *et al.* (1962) observed depression of growth giving higher doses of tranquilizer in diet.

Darwish *et al.* (1967) found that the tranquilizer, in addition to saving food intake, improves the quality of meat by diminishing the moisture content with a consequent rise in dry matter especially fat and protein content.

The purpose of the present study was to determine the effect of tranquilizer on body weight, gain weight, feed consumption, feed efficiency, eviscerated percentage and edible percentage of Fayoumi pullets exposed to thermal stress.

Material and Methods

The present study was carried out at the poultry experimental station. Department of Animal Production, Faculty of Agriculture. Cairo University. A number of 750 day old Fayoumi chickens was used. Chickens divided into three main-groups, each group was divided into five sub-groups including 50 birds. The three maingroups were 1 — Constant high environmental temperature (90°F) from hatch until the 12*th* week of age. 2 — Normal environmental temperature which ranged from 90°F during the first week and decreased 3°F weekly till 65°F. 3 — Cool environmental which maintains the temperature at 85°F during the first week and decreased 10°F weekly till 65°F.

Each previous treatment (maingroup) contained five tranquilizer fed groups (subgroup). The subgroups were given rations containing 0.0, 0.5, 1.0 p.p.m. reserpine, 0.5 and 1.0 p.p.m. hydroxyzine in the 1, 2, 3, 4 and 5 subgroups respectively.

The main ration fed to all batches consisted of 40% maize, 10% horse beans, 12% wheat bran, 12% rice bran, 20% decorticated cotton seed meal and 6% fish meal. The ration was supplemented by 0.5% salt (sodium chloride), 1% bone meals, 3% calcium gluconate and 2% feed supplement pfizer vitamin A + D_3 (vit. A 5000 Iu/g and vit. D_3 500 Iu/g). The starch value was 64.4% and crude protein was 22.5%.

Body weight and feed consumption were recorded and weight gain and feed efficiency were calculated from 0-12 weeks of age. At 12 weeks of age (the end of the experiment) 6 birds from each subgroup were individually weighted, slaughtered by throat cutting. After bleeding, the birds were scolded and the feathers were plucked. The head was cut off at the throat and the legs were removed at the hock. The carcass were then opened, eviscerated and deboned. Two samples of meat from each bird, one from the breast and the other from the thigh, were dried at 105° for 12 hr. Eviscerated weight, edible weight and moisture percent were recorded at 12 weeks of age. Data were analyzed by application of the analysis of variance test (Snedecor, 1962).

Results and Discussion

It is evident from the data in Table 1 that chicks reared under normal temperature gave the highest increase in body weight and weight gain followed by those reared under high and low temperature. Adams *et al.* (1962) attributed the reduction of growth in hot climate to reduction in feed intake. Okomato *et al.* (1961) found that the thyroid activity and metabolic processes are liable to slow in hot weather.

Table 1 shows also that treatment with tranquilizers from hatch till 12 weeks of age increased body weight and weight gain, under any environmental temperature, as compared to control groups. This result proves clearly that the tranquilizers are particularly effective in opposing the deleterious effect of high environmental temperature in stunting the growth of animals. Moreover, tranquilizers reduced the physical activity and dinimished energy expenditure. Conceivably the action was mediated through the nervous system to the organs of digestion and assimilation (Darwish, 1967).

TABLE 1. Average body weight, weight gain, feed consumption (g / individual) and feed efficiency for different groups treated with tranquilizers under heat stress.

Temperature 0-12 weeks	Levels of Tranquilizers (ppm)		Body weight 12 weeks	Gain weight	Feed consumption 0 - 12 weeks	Feed efficiency
High 90°F	Control	0.0	546.2	519.1	2310.0	4.47
	Reserpine.	0.5	695.3	664.9	2492.0	3.43
		1.0	674.3	644.9	2389.8	4.14
	Hydroxyzine.	0.5	689.5	659.9	2434.6	3.56
		1.0	599.8	570.3	2408.0	4.61
Normal 90°...65°F	Control	0.0	624.7	594.1	2457.0	4.14
	Reserpine.	0.5	793.3	762.5	2746.8	3.71
		1.0	748.7	717.7	2357.6	3.29
	Hydroxyzine.	0.5	771.1	741.5	2661.4	3.63
		1.0	717.9	687.9	2283.4	3.17
Low 65°...65°F	Control	0.0	622.2	592.6	2598.4	4.65
	Reserpine	0.5	742.5	712.5	2909.2	4.44
		1.0	714.5	685.1	2756.6	4.18
	Hydroxyzine.	0.5	718.4	687.7	2758.0	4.22
		1.0	679.1	649.3	2589.4	4.21

It appears from Table 1 also that the increase in body weight and weight gain was more pronounced when chicks were supplied with reserpine than hydroxyzine.

Table 1 confirms also that supplying tranquilizers to the ration of growing chicks increased the average feed consumption and feed efficiency, as compared to the control groups. From the date of hatch till the 12*th* week of age, the average feed efficiency for the treated groups was 3.87 under high temperature, 3.45 under normal temperature and 4.27 under low temperature compared to the control groups of 4.47, 4.14 and 4.65 respectively (Table 1). From these results it can be noted that during the growing period tranquilizers are more effective in improving feed efficiency under normal temperature rather than high or low temperature. Also, it is clear from Table 1 that chicks supplied with reserpine were better in feed conversion than those receiving hydroxyzine.

The improved efficiency of feed utilization by treated chicks is due to the faster growth in the treated chicks than in the control groups. Also, the tranquilizers affect feed efficiency through the reduction of physical activity and thus they diminish in energy expenditure.

Eviscerated and edible percentages are shown in Table 2. It is evident that eviscerated and edible percentages were affected by thermal stress. The highest percentages were found in birds maintained in normal environmental temperatures, followed by those maintained in higher environmental temperatures, but the lowest percentages were obtained from birds maintained in cooler environmental temperatures.

TABLE 2. Average eviscerated and edible percentage for the different groups treated with tranquilizers under heat stress.

Temperature 0-12 weeks	Levels of Tranquilizers (ppm)		Eviscerated %	Edible %
	Control	0.0	67.48	79.30
High	Reser-	0.5	73.10	80.20
	pine.	1.0	77.12	82.78
90°F	Hydroxy-	0.5	69.48	79.72
	zine.	1.0	75.80	81.50
	Control	0.0	73.42	80.70
Normal	Reser-	0.5	78.87	81.45
	pine.	1.0	80.20	82.55
90°..65°F	Hydroxy-	0.5	74.78	81.13
	zine.	1.0	79.63	81.87
	Control	0.0	66.83	76.47
Low	Reser-	0.5	68.32	78.45
	pine.	1.0	71.75	80.20
85°..65°F	Hydroxy-	0.5	67.03	78.38
	zine.	1.0	70.23	78.72

Table 2 shows also a positive effect on eviscerated and edible percentages by increasing the dose of tranquilizer. These percentages were greater at 1.0 p.p.m. than 0.5 p.p.m. Also, reserpine was more effective in increasing eviscerated and edible percentages than hydroxyzine.

The addition of tranquilizers to the ration of growing chicks increased eviscerated and edible percent. At 12 weeks of age, the average difference in eviscerated percent was 6.4% per head under high temperature, 5.0% under normal temperature and 2.6% under low temperature.

Statistical analysis showed that body weight and eviscerated percentage were affected significantly ($p < 0.01$) by thermal stress and tranquilizers. The interaction between environmental temperatures and tranquilizer-fed was not significant. Differences in edible percentages due to thermal stress, tranquilizers and their interaction were not significant.

It appears from Table 3 that the higher environmental temperature and/or rate of tranquilizer resulted in depression in moisture percent in meat, namely increase in dry matter. Darwish *et al.* (1967) found also that the tranquilizer improved the quality of meat by diminishing the moisture content with a consequent rise in dry matter.

TABLE 3. Average moisture (%) in the meat for the different groups treated with tranquilizers under heat stress.

Levels of Tranquilizers (ppm)		Temperature		
		High 90°F	Normal 90.....65°F	Low 85°.....65°F
Control	0.0	57.97	58.34	59.67
Reser-	0.5	52.37	53.56	54.98
pine.	1.0	49.14	51.99	53.33
Hydroxy-	0.5	53.72	54.56	55.16
zine.	1.0	50.84	52.88	54.45

The improved efficiency of eviscerated and edible percentages by treated birds is due to the faster growth and feed utilization in the treated chicks than in the control groups.

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اثر المهدئات على انتاج اللحم فى الفيوومى تحت درجات حرارة مختلفة

مختار عبد الفتاح ، سوزان احمد رياض وجمال قمر

كلية الزراعة ـ جامعة القاهرة .

تم توزيع ٧٥٠ كتكوتا بعمر يوم الى ثلاث مجاميع توضع كتاكيت المجموعة الاولى من عمر يوم وحتى ١٢ اسبوعا تحت درجة ثابتة ٩٠ف ، بينما المجموعة الثانية تكون درجة حرارة التحضين فيها ٩٠ف فى الاسبوع الاول وتنخفض ٣ درجات فهرنهيتية/ اسبوع حتى تصل الى ٦٥ف . اما المجموعة الثالثة فتبدأ بدرجة ٨٥ف وتنخفض اسبوعيا ١٠ درجات فهرنهيتية حتى تصل الى ٦٥ف .

وقسمت كل مجموعة من الثلاث مجاميع الى ٥ معاملات حيث تضاف اليها المهدئات فى العلف ، فثلاث معاملات تكون باضافة رزربين الىالعلف بالمستويات صفر ، ٥ر ، ــ١ جزء فى المليون ومعاملتـــان باضـــافة هيدركسيزين بالمستويات ٥ر ، ــ ر ١ جزء فى المليون وتم تقدير وزن الجسم والزيادة الوزنية واستهلاك العلف والكفاءة الغذائية من عمر (صفر ــ ١٢ اسبوع) . وعند عمر ١٢ اسبوعا اخذت ٦ طيور من كل مجموعة وقدر بها نسبة التصافى ونسبة اللحم المأكول ونسبة الرطوبة بها . وكانت النتائج كما يلى :ــ

١ ــ نمو الكناكيت تحت درجات الحرارة العادية لمدة ثلاثة شهور اعطى زيادة فى وزن الجسم والزيادة الوزنية والكفاءة الغذائية ونسبة التصافى وكمية اللحم الماكول عنه بالنسبة لدرجات الحرارة الاعلى والاقل من ذلك .

٢ ــ اضافة المهدئات الى العلف اظهـــــر زيادة فى وزن الجسم والزيادة الوزنية والكفاءة الغذائية ونسبة التصافى وكمية اللحم الماكول والمادة الجافة .

٣ ــ المستوى العالى من المهدئات ادى الى تحسين صفات الذبيحـــــة عن المستوى المنخفض .

٤ ــ اتضح ان الرزربين اكثر كفاءة وفاعلية فى الهيدروكسيزين تحـت درجات الحرارة المختلفة بالنسبة لجميع الصفات المدروسة .