

The Role of Iodine and Thyroid Gland on Reproduction and Production of the Chickens 1-Growth and Performance

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THE EFFECT of desiccated thyroid and potassium iodide on Fayoumi chicks were investigated, chicks were fed the tested thyroactive substances when they were 18 weeks old on two levels. 200 g or 1009 desiccated thyroid / 100 kg. diet and 39.213 g or 19.60 g potassium iodide / 100 kg. diet. Results given revealed that males grow faster than females. Growth rate were of three categories : fast, medium and slow growth rate. The results obtained in this particular work revealed that males grow faster than females. The differences in body weight between the different rates of growth or sexes were highly significant at all ages before treatments. Growth rates of Males and females were increased by treatments, used during the first month of experimental period, except females, of slow growth rates which weighed pike the control during this period. The effect of treatments during the whole period was more observed in females. Moreover, the use of high levels of thiroactive substances to correct hypothyroidism increased cocks body weight than any other treatment, while the hens showed almost the same weights as control.

Several comprehensive reviews of the role of iodine are available. Thyrosine and thyroxine like substances were found to have a specific effects on growth rate of chickens (Al-Zujajy, 1967). There were great discrepancies between results of thyroxine and iodine administration obtained by different workers. The daily injection of thyroxine was found to increase body weight (Winchester, 1949, Sondonal and Tavor, 1963 and Tanabe, 1965) while Miller *et al.*, (1962) found that small doses of 1.3 ug. thyroxine slightly reduced body weight and high doses of 3 to 9ug thyroxine caused severe decrease in body weight. On the other hand, feeding thyroprotein at high levels was found to reduce body weight (Oloufa, 1953a, b, 1954 and 1955; Gonzga, 1954 and 1955; Gonzga and Nadiogo, 1955 and Kamar 1962). While, Wherler *et al.*, (1955) stated that feeding thyroprotein had a stimulating effect on the growth of growing chicks.

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Moreover, the results concerning sexual maturity are rather conflicting. This study deals with the effect of thyroid gland administration on the growth and development of Fayoumi chick.

Material and Methods

Four hundreds and fifty Fayoumi chicks hatched in December were fed the experimental ration shown in Table 1, Egyptian clover was supplied as green fodder. The chicks were brooded, reared and managed alike, body weight was recorded bi-weekly till the 18th week of age, then body weight was recorded monthly sexing was carried out at 13th week of age. Each sex was divided into three groups according to body weight, high, medium and low. At the 18th week of age birds were divided into 21 groups of treatments 5 groups from the high weight birds, 5 groups from low weight birds and 11 groups from medium weight birds. The specific treatment in every group are shown in Table 2. All the applied treatments continued for two months up till 26th week of age.

The actual observations were recorded, differences as percentages were related to control according to, before, during and after treatments.

TABLE 1. Experimental ration

Ingredient	Percentage
Corn	50
Ricebranc	14
Wheat bran	10
Cortecated cottonceed meal . .	20
Fish meal	3
Calcium carbonate	2
Salt	0.5
Mineral Mixture	0.5
Total	100.00
Total protein	18.5
Crude fibre	10
TDN	27

Results and Discussion

Fayoumi chicks used in this trial although hatched at the same day and reared alike, yet they showed different growth results which necessitated to classify them into high, medium and slow growing birds. Males were heavier than females in the three groups during all experimental periods. Differences in body weight between three groups were highly significant until treatments began at the 18th week of age.

TABLE 2. The Different treatments used in the study

Growth rate	No. of treatment	Treatment substance, level and time
High, medium and low	A. Treatments used in the three levels of growth	
	I	Desiccated thyroid high level for two months, 200g /100 kg diet
	II	Desiccated thyroid low level for two months. 100g /100 kg diet
	III	Potassium iodide high level for two months. 39.213g /100 kg diet containing 30 g I
	IV	Potassium iodide low level for two months. 19.6g /100 kg diet containing 15 g I
Medium	V	Controls.
	B. Additional treatments used in the medium level of growth only.	
	VI	Desiccated thyroid high level after sulfa-treatment of low level for a month, 100 g/100 kg of diet.
	VII	Potassium iodide high level after sulfa-treatment of low level for a month.
	VIII	Desiccated thyroid high level after sulfa-treatment of high level for a month. 300 g/100 kg of diet.
	IX	Potassium iodide high level after sulfa treatment of high level for a month,
	X	Desiccated thyroid level after serving as a control for a month
XI	Potassium iodide high level after serving as a control for a month	

*Effect of different treatments on body weight*A. *Males*1. *Males of high growth group*

Great increase in body weight was observed after one month of treatment (Table 4). The groups fed desiccated thyroid gland of high and low levels (Treatments I and II) showed the highest increase in body weight of 212% and 198% respectively. Groups fed with potassium iodide (KI) of high level increased 185%. The low level of K I increased 148%. In the second month of treatment irregular trend was observed (Table 4).

The total increase in body weight in the two months showed percentage increase almost like the control. The high increase induced by the different treatments in the first month was reduced in the second month (Table 5).

2. *Males of medium growth group*

During the first month of treatments great increase in body weight was observed (Table 3). Groups fed with high level of desiccated thyroid showed the highest increase, those fed low level of thyroid showed the least increase. The two levels of K I increased body weight with the trend. The four groups sulfa-quanaxalline showed irregular results, indicating that these treatments do not affect body weight increase during the first month of feeding.

The percentage increase in body weight in the second month was low (Table 4). Only high increase was observed in the groups fed with thyroid and iodine when they were previously fed high level of sulfa.

In general, the decrease in response of the second month lowered the percentage increase in body weight of the two months of treatment when grouped together (Table 5).

3. *Males of low growth group*

Body weight of low growing chicks was slightly stimulated in the first month of all the treatments. In the second month, the percentage of body increase was reduced by treatments (Table 4). This affected the final results of both months of treatment, as it reduced the slight stimulation occurred by treatments in the first month (Table 5).

In general, the three initial groups of growing males differ from each other in their response to the treatment. High growth rate chicks showed their most responsiveness in the first month only. The medium rate group showed also the highest response in the first month but with less degree than the first group. The low growth rate group responded slightly to the treatment.

TABLE 3. Body weight of cockerels., change per cent due to treatment and difference per cent to control of different treatments and different growth rates (after one month of treatment).

C.R.	Treatment	Beg. of treat (18 weeks)	After 1 month, of treatment (22 weeks)	Change	Difference %	Difference % to C
High	C.	992.50	1134.17	141.67	14.38	100
	I	1012.50	1321.25	308.75	30.49	212
	II	974.50	1216.87	269.37	28.42	198
	III	987.50	1250.62	263.12	26.64	185
	IV	1050.62	1275.00	224.38	21.36	148
Medium	C.	777.29	985.29	208.00	26.76	100
	I	265.71	1236.42	370.71	42.82	160
	II	882.57	1075.71	193.14	21.88	82
	III	847.14	1210.00	362.86	41.44	155
	IV	875.71	1244.28	368.57	42.09	157
	VI	834.37	1127.50	293.43	35.16	131
	VII	876.25	1106.87	230.62	26.32	98
	VIII	835.00	1079.37	244.37	29.26	109
	IX	873.12	1168.12	295.00	33.79	126
Low	C.	650.00	887.50	237.50	36.54	100
	I	666.87	952.50	285.63	42.83	117
	II	532.86	827.50	294.64	55.29	115
	III	632.86	928.57	295.71	46.72	128
	IV	677.50	996.25	318.75	47.04	129

C = Control group.

During the second month of treatment, all the three groups showed less percentage in the increase of body weight, but that decrease was observed markedly in the high, and slightly in low groups.

TABLE 4. Body weight of cockerels, change percent due to treatment and difference per cent to control of different treatments and different growth rates. (The difference between 1 and 2 months of treatment).

G.R.	Treatment	After 1 mo. of treatment (22 weeks).	After 2 months of treatment (26 weeks).	Change	Difference %	Difference % to C.
High	C.	1134.17	1377.67	243.50	21.47	100
	I	1321.25	1414.37	93.12	7.05	33
	II	1216.87	135.00	133.13	10.94	51
	III	1250.62	1283.75	33.13	2.65	12
	IV	1275.00	1366.25	91.25	7.16	33
Medium	C.	985.29	1182.69	197.40	20.03	100
	I	1236.42	1341.43	105.01	8.49	42
	II	1075.71	1244.26	168.57	15.67	78
	III	1210.00	1348.33	138.33	11.43	57
	IV	1244.28	1424.28	180.00	14.47	72
	VI	1127.50	1212.50	85.00	7.54	38
	VII	1106.87	1160.00	53.13	4.80	24
	VIII	835.00	1116.25	281.25	33.68	168
	IX	873.12	1193.75	320.63	36.72	183
	X	1005.00	1229.37	224.37	22.32	111
	XI	981.25	1137.50	156.25	15.92	79
Low	C.	887.50	1156.67	269.17	30.33	100
	I	952.50	1110.00	157.50	16.53	54
	II	827.50	1061.67	234.17	28.30	93
	III	928.57	1040.00	111.43	12.00	39
	IV	996.25	1198.75	202.50	20.33	67

C. = Control group.

TABLE 5. Body weight of cockerels change per cent due to treatment and difference per cent to control of different treatments and different growth rates.
(After 2 months of treatment).

G.R.	Treatment	Beg. of treatment (18 weeks)	After 2 months of treatments (26 weeks)	Change	Difference %	Difference% to C.
High	C.	992.50	1377.67	385.17	38.81	100
	I	1012.50	1414.37	401.87	39.69	102
	II	947.50	1350.00	402.50	42.48	109
	III	987.50	1283.75	296.25	30.00	77
	IV	1050.62	1366.25	315.63	30.04	77
Medium	C.	7777.29	1182.69	405.40	52.15	100
	I	865.71	1341.43	745.72	54.95	105
	II	882.57	1244.28	361.71	40.98	78
	III	847.14	1348.33	501.19	59.16	113
	IV	875.71	1424.28	548.57	62.64	120
	VI	834.37	1212.50	378.13	45.32	87
	VII	876.25	1160.00	283.75	32.38	62
	VIII	835.00	1116.25	281.25	33.68	64
	IX	873.12	1193.75	320.63	36.72	70
	X	777.29	1229.37	452.08	58.16	111
	XI	777.29	1137.50	360.21	46.34	89
Low	C.	650.00	1156.67	506.67	77.95	100
	I	666.87	1110.00	443.13	66.45	85
	II	532.86	1061.67	528.81	99.25	127
	III	632.86	1040.00	407.14	64.33	82
	IV	677.50	1198.75	521.25	76.94	99

C = Control group.

B. *Females*1. *Females of high growth*

All the treatments used were found to stimulate growth rate more than the control. In the first month of treatment, the low level of thyroid and high level of K I, showed the highest percentage increase of body weight. Meanwhile, those of high level of thyroid and low level of K I showed slight increase in body weight (Table 6). Negative effect was observed during the second month of treatment in all groups except the group fed high level of thyroid (Treatment. I, Table 7).

TABLE 6. Body weight of pullets, change per cent due to treatment and difference per cent to control of different treatments and different growth rates.
(After one month of treatment).

G.R.	Treatment	Beg. of Treat. (18 weeks)	After 1 month. (22 weeks)	Change	Difference %	Difference % to C.
High	C.	844.44	992.22	147.78	17.50	100
	I	813.33	970.00	156.67	19.26	110
	II	822.50	1052.50	230.00	27.96	160
	III	758.33	1007.78	249.45	32.89	188
Medium	C.	677.58	870.52	192.94	28.47	100
	I	676.50	855.00	178.50	26.38	93
	II	631.00	841.00	210.00	33.28	169
	III	629.50	866.67	237.17	37.38	132
	IV	663.64	875.45	211.81	31.91	112
	VI	695.00	858.00	163.00	23.45	82
	VII	726.50	908.00	181.50	24.98	88
Low	C.	522.50	718.00	195.50	37.42	100
	I	549.50	698.00	148.50	27.02	72
	II	493.33	663.89	170.56	34.57	92
	III	570.00	748.50	178.50	31.31	84
	VI	514.00	675.50	161.50	31.42	84

TABEL 7. Body weight of pullets, change per cent due to treatment and difference per cent to control of different treatments and different growth rates.
(The difference between 1 and 2 months of treatment).

G.R.	Treatment	After 1 month of treat. (22 weeks).	After 2 months of Treat. (26 weeks).	Change	Difference %	Difference to C.
High	C.	992.22	1025.00	32.78	3.30	100
	I	970.00	1077.50	107.50	11.08	335
	II	1052.50	1025.00	-27.50	-2.61	-79
	III	1007.78	980.00	-27.78	-2.75	-83
	IV	959.00	958.00	-1.00	-10.0	-0.3
Medium	C.	870.52	1007.36	136.84	15.72	100
	I	855.00	978.00	123.00	15.38	91
	II	841.00	900.00	59.00	7.01	44
	III	866.67	956.67	90.00	10.38	66
	IV	875.45	996.36	120.91	13.81	88
	VI	858.00	941.11	83.11	9.69	62
	VII	908.00	950.00	42.00	4.62	29
	VIII	897.86	924.28	26.42	2.94	19
	IX	986.00	997.14	11.14	1.13	7
	X	877.78	950.00	72.22	8.23	52
	XI	820.62	947.14	126.52	15.41	98
Low	C.	718.00	885.00	167.00	23.26	100
	I	698.00	856.00	158.00	22.63	97
	II	663.89	836.67	172.78	26.02	111
	III	748.50	909.00	160.50	21.44	92
	IV	675.50	828.00	152.50	22.57	97

The total increase in body weight of the two months together showed the highest increase in the high levels of treatment either that of desiccated thyroid or potassium iodide (Table 8).

TABLE 8. Body weight of dpullets, change per cent due to treatment and difference per cent to control of different treatments and different growth rates. (After 2 months of treatment).

G.R.	Treatments	Beg. of treat. (18 weeks)	After 2 months of Treat. (26 weeks)	Change	Difference %	Difference % to C.
High	C.	844.44	1025.00	180.56	21.38	100
	I	813.33	1077.50	264.17	32.48	152
	II	822.50	1025.00	202.50	24.62	115
	III	758.33	980.00	221.67	29.23	137
	IV	811.00	958.00	147.00	18.12	85
Medium	C.	677.58	1007.36	329.78	48.67	100
	I	676.50	978.00	301.50	44.57	91
	II	631.00	900.00	269.00	42.63	87
	III	629.50	956.67	327.17	51.97	107
	IV	663.64	996.36	332.72	50.13	103
	VI	695.00	941.11	346.11	49.80	102
	VII	726.50	950.00	323.50	44.53	91
	VIII	699.28	924.28	225.00	32.17	84
	IX	706.67	997.14	290.47	41.10	84
	X	677.58	950.00	272.42	40.20	82
	XI	677.58	947.14	269.56	39.78	82
Low	C.	522.50	885.00	362.50	69.38	100
	I	549.50	856.00	306.50	55.78	80
	II	493.33	836.67	343.34	69.59	100
	III	570.00	909.00	339.00	59.47	86
	IV	514.00	828.00	314.00	61.09	88

C = Control group.

2. Females of medium growth

Low level of thyroid and high level of K I showed high increase in body weight in the first month of treatment, whereas high level thyroid and low level of KI showed an increase in body weight like to the control during the same period. All the treatments of sulfa-quanaxalline did not affect body weight (Table 5).

Lower increase, by all treatments in body weight was observed during the second month of treatment (Table 7).

The results of the first month were affected by that decrease observed in the second month, so, most of the treatments decreased in the total percentage increase in body weight (Table 8).

3. Females of low growth

All treatments lowered the percentage increase of body weight (Table 6).

During the second month, the treatments did not affect body weight and there was no marked decrease in the percentage of body weight. (Table 7). Accordingly, there were no appreciable increases in body weight of the two months when grouped together (Table 8).

In general, the effect of the treatments on the three groups of different growth was only induced upon the high growth rate. Differences in the total increase of body weight between all treatments were significant for both of the high and medium growth rates, whilst it was insignificant in the low growth rate group. The differences between sexes were highly significant in all treatments (Table 10).

Most of the effect on both males and females was observed in the first month of treatment then, the birds showed refractoriness to the treatments during the second month. These results agree with those of Sandonal and Tovar (1963), who stated that small doses of thyroxine increased body weight, whereas, high doses decreased body weight, So, when the treatment continued during the second month, where the birds received more desiccated thyroid, their body weight decreased than the control. Birds of low growth rate did not decrease their body weight in the second month of treatment but continued in increasing body weight. This may be due to their intrinsic low thyroid activity.

When the thyroid gland was depressed by sulfa, the subsequent administration of thyroid gave heavier bodies than any other treatment. Males did not show refractoriness in the second month to the treatment. Meanwhile; the females showed results of refractoriness to the treatment in the second month of treatment.

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تأثير اليود والغدة الدرقية على التناسل والانتاج في
الدجاج
أولا - النمو والصفات المرتبطة

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أعطيت الكتاكيت فى سن ١٨ أسبوع جرعات من الغدة الدرقية واليود بنسب
مختلفة وقد أدى ذلك الى زيادة وزن الديوك بنسبة أكبر من زيادة وزن
الاناث وكذلك أدت الجرعات المتوسطة الى زيادة وزن الجسم زيادة معنوية
عن الجرعات الكبيرة .