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The Role of Iodine and Thyroid Gland on Reproduction and Production of Chickens. V- Gonads, Endocrines and Histological Integration

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CHICKS fed thyroactive substances at 18 weeks old; (a)200g or 100 g desiccated thyroid / 100 kg diet and (b) 39.213 g or 19 .60g potassium iodide / 100kg diet. Growth rate were fast, medium and slow. Feeding dried thyroid showed a decrease in thyroid weighis, whereas, all the groups of (KI) showed heavier thyroids. Absolute and relative weights of the adrenal gland were increased by the treatments. A slight decrease was observed in the absolute and relative weights of thymus, ovarys oviduct in treated pullets. Also, they were of shorter oviduct than, their controls. The total number of ocytes and ruptured follicles lowered in the number of the treated pullets. The correcting of hypo-thyroidism induced, by potassium iodide increased testes weight, whereas, the correcting hypothyroidism by thyroid decreased it. In high and medium growth rate groups, the low level of different trreatments, were found to increase the activity of thyroid gland rather than the high ones, where they showed slight decrease in the activity in relation to control. In slow growing birds, the high levels of treatments showed higher estimated value of thyroid activity than the low ones. All hypothyroidism birds, showed higher-activity of thyroid gland after correcting the hypo-function by the high levels of thyroid substances.

There were great discrepancies between results of thyro-active substances treatment upon the different endocrine weights and functions obtained by different workers. The administration of desiccated thyroid gland to cockerels of 7 weeks old with the range of 10-30mg caused the atrophy of the glandular tissue and disturbance of spermatogenosis was observed (Tsukunaga and Takahashi, 1959). Thyroprotein when fed to birds with a level of 0.02% of ration had a decreasing effect on thyroid weight (Turner *et al.*, 1946, Meelen and Hill, 1953). Testes weights were significantly higher when male birds were treated with the previous level of thyroprotein from the day of hatch until the 12th week of age (Wheeler and Hoffman, 1948) and at the 24th week of age (Gonzga and Nanadiego, 1955) whereas, they found a lighter in the 12th week and 18th week of treatment. Weeler *et al.*(1948), found significant decrease in weight of comb and testes by feeding 10g /100lbs of feed of throprotein for 12 week period. The former level of thyroprotein used by Husten and Weeler (1949), and they found that the weights of comb, pituitary, adrenals, parathyroid and testes were higher than those of control. Kamar,

(1961) fed different levels of thyroprotein (0.006,0.011, 0.017 and 0.022%), he found that the testes weight of White Balladi cocks of 2-years old by the level of 0.011% were increased but by the level of 0.017% were decreased and atrophy of testes was obtained by the level of p 0.022%. However, mild doses of thyroprotein (0.011,0.017%) increased thymus weight and adrenal relative weight, but (0.006 and 0.022%) caused the atrophy of thymus and a reduction of adrenal absolute weight. Turner *et al.* (1946) found that the ovaries of pullets were heavier than those of controls when fed 10g/100lbs thyroprotein.

McCartney an Shaffner (1949) found that thyroid glands of chicks which were hatched from thyroxine injected eggs were 20% smaller than those of chicks were hatched from pullets fed thyroprotein or thiouracil were heavier than controls. Shaffner and Andrews (1947) concluded that feeding thiouracil with 0.2 / and 0.5% of ration decreased the ability of gonads to produce viable spermatozoa capable of surviving normal length of time in the oviduct of hen. Meanwhile, 0.2% thiouracil in combination with 13 to 15 mg of stilbestrol or stilbestrol alone produced significant gonad depression and increasing effect on thyroid weight in W.R. cockerels aged 6 to 12 weeks (Andrews and Bohren, 1947). Thiuorea was fed to hybred chicks as 1% of the diet for 20 weeks, decreased testes weight and increased thyroid weight (Dangelo *et al.*, 1947) or by 0.02% thiouracil (Moreng and Shaffner, 1948).

Evaluating thyroid activity by histological examination helps studying its activity in relation to other organs or glands (Lever,1948 and Kamar, 1960 and 1961), or by measuring the height of the epithelial cells and observing the amount in the follicles (Sturkie 1954 and Abou Elnaga, 1967).

Kamar (1961), found that the thyroid tissue of the untreated group of White Baladi was greatly compacted, while the group that received a level of 0.022% thyroprotein was slightly copmacted. Follicles were larger in size by increasing the level of treatment. Colloid substances were observed to fill the lumen in the controls. The lumen of cocks receiving 0.011% and 0.017% of thyroprotein showed medium quantities of colloids. The lowest colloid substances quantity was observed in the groups treated with 0.022%. This study showed as the level of thyroprotein increases, the number of both interfolliculer and follicular cells decreases, and the diameter increases, showing a gradual decrease in function with the increase of hyper thyroidism rate.

The sulfa-compounds has been found to have an anti-thyroid substance (Mackenzie, 1943; McGavak, 1951; and Williams, 1965). Robert and Garb (1947), found that the administration of sulfanamides in the drinking water did not give resulte quite as good as those when administered in the feed. Hypertrophy and hyperplasia of thyroid epithilium of male birds were observed by 0.2% and 5% of thiouracil treatment for 18 weeks (Shaffner and Andrews, 1947). Voitkovie and Kosin (1947), administerd W.L. cocks for 12 days with 300mg thiouracil, and hens of the same breed with 200mg thiouracil, and pigeons with 50mg thiouracil. The results showed that the thyroid of the fowls did not hyper-

trophy, but those of pigeones did. The thyroid tissue of all experimental birds retained their vasicular structure but the visible cavities contained no colloid.

Material and Methods

Four hundreds and fifty Fayoumi chicks hatched in December were fed a ration which was composed of 50% corn, 14% ricebran, 10% wheat bran, 20% decorticated cotton seed meal, 3% fish meal, 2% calcium carbonate, 0.5% salt and 0.5% minerals mixture. The ration contains 18.5% crude protein, 10% crude fiber and 27% TDN. Egyptian clover was supplied as green fodder. The chicks were broaded, reared, and managed alike, body weight was recorded bi-weekly till the 18 week of age, then it was recorded monthly, sexing was carried out at the 13th week of age. Each sex was divided into three groups according to body weight; high medium and low. At the 18 th week of age birds were divided into 21 groups of treatments, 5 groups from the high weight birds, and 11 groups from medium weight birds and 5 groups from the low weight birds. The specific treatment in every group are shown in Table 1. All the applied treatments continued for two months up till 26 th week of age. Then, 3 pullets and 3 cockerels were slaughtered from every group of treatment. Different organs and glands of these birds were weighed and measured. Histological technique for the thyroids was done as explained in Carleton (1938) and El-Rakhawy (1971). The slides of the thyroids of 6 individuals (3 males and 3 females) of each group were examined. The number of epithelial cells was counted and the inner diameters were measured for 5 central follicles comprising 120 counts and 120 measurements for each group including 60 measurements and 60 counts for each sex in each group. The diameter as obtained by the projecter scale, was multiplied by 2 to express the measurement in microns. The examination was on the magnification of 500 X. Analysis of variance for all the previous data was done.

Results and Discussions

The treated birds showed lower eviscerated percentage (Table 2,4) which may be due to the less ability for fat deposition by hyper-thyroidism birds (Kamar,1962). When the low growing pullets showed an improvement in this percentage and gave more eviscerted percentage, this may be due to that the thyroid treatments induced mild hyperthyroidism that improved the carcass. This also may be due to that the pullets at sexual maturity which increased the rate of lipids and vitamins metabolism and the rate of glucose and galactose absorption from the intestine by the activation of thyroid hormone (Williams, 1965). All these factors caused this increase of eviscerated percentage. However, differences in carcass and body weight were found to be not significant between treatments, and highly signifcant between sexes of all the three rates of growth (Table 7).

TABLE 1 The different treatments used in the study.

Growth rate	No. of treat-ment	Treatment substance, level and time
		A-Treatments used in the three levels of growth
	I	Desiccated thyroid high level for two months : 200g / 100kg diet
	II	Desiccated thyroid low level for two months : 100g / 100kg diet
High medium	III	Potassium iodide high level for two months : 39.213g / 100kg diet containing 30g I.
and	IV	Potassium iodide low level for two months : 19.60g/100kg diet containing 15g I.
Low	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, 100g/100kg of diet.
	VII	Potassium iodide high level after sulfa-treatment of low level for a month.
Medium only	VIII	Desiccated thyroid high level after sulfa-treatment of high level for a month, 300g/100kg diet.
	IX	Potassium iodide high level after sulfa-treatment of high level for a month.
	X	Desiccated thyroid high level after serving as a control for a month.
	XI	Potassium iodidehigh level after serving as a control for month.

Normal gonadal function requires normal thyroid function. Thyroid hormone, in optimal physiological doses, not only corrects the abnormalities induced by hyper-thyroidism, but it may also produce premature sexual developments in normal growing animals. Excessive doses of thyroid hormone exert an adverse effect on the reproductive organs (Williams, 1965). This may occur by the indirect effect of thyroxine on inhibiting of gonadotropic hormone by the excessive levels of thyroxine in blood stream.

In this study, when the treatments continued for 60 days and the treatment time took place from pre and post sexual maturity this caused the decrease in the weight of ovary, testes and oviduct (Tables 3a, b and 4) of the number of total oocytes (Table 5) or the length of oviduct. Kamar (1962) found the same trend with the secondary sex organs.

TABLE 2. The effect of treatments on relative weights of gonads and endocrines of cockerels of different growth rates.

C.R.	Treatments	Carcass %	Thyroid* %	Thymus %	Pitutairy* %	Adranal* %	Tastes %
High	I	68.95	0.106	1.86	0.178	1.34	2.17
	II	70.03	5.063	2.91	0.135	1.43	1.48
	III	67.48	0.140	3.83	0.157	1.54	1.65
	IV	67.31	0.109	1.82	0.188	1.60	2.33
	V	69.31	0.090	3.90	0.152	1.48	1.65
Medium	I	67.26	0.120	1.75	0.234	2.10	2.02
	II	68.88	0.063	3.96	0.190	2.01	1.11
	III	68.43	0.132	4.48	0.112	1.51	1.72
	IV	68.00	0.106	2.02	0.214	1.57	2.21
	V	68.51	0.116	3.73	0.166	1.48	1.49
	VI	62.29	0.107	2.78	0.175	1.72	0.87
	VII	65.73	0.148	4.22	0.172	1.98	2.63
	VIII	65.92	0.100	1.94	0.224	1.98	1.41
	IX	65.90	0.139	3.08	0.203	1 87	2.20
	X	68.69	0.097	1.89	0.259	1.42	0.57
	XI	66.67	0.131	4.27	0.188	2.03	2.03
Low	I	63.31	0.120	3.02	0.202	1.64	1.21
	II	66.20	0.073	5.00	0.280	2.20	2.40
	III	64.83	0.125	5.23	0.177	1.89	1.47
	IV	64.46	0.100	3.58	0.207	2.02	1.65
	V	78.20	0.115	5.26	0.187	2.18	1.48

* Milligrams of this endocrine for each 100 grams of body weight.

The thyroxine is formed in the thyroid gland from the amino acid tyrosine and the diodotyrosine. Thyrosine is iodinated to form the latter chemical compound from which thyroxine is formed (Stexkie, 1954; Williams, 1965; and McGavak, 1951). Accordingly, iodine seemed to be very important to thyroxine synthesis. Theoritically speaking, the state of feeding iodine salts differ physiologically rather than treating of feeding birds with natural or synthysed thyeoxine. The former method may promote the gland to synthesizes thyroid hormone, because of the strong affinity of animals and birds thyroids for iodine (Stekie, 1954), whereas, the latter way rises the level of thyroxine in the blood stream directly. Iodine treatments used in this study, increased the absolute and relative weights of thyroid gland (Tables 3 and 4) which may suggest that these treatments increased thyroxine synthesis and or increasing the quantity of colloidal substance in the gland follicles.

TABLE 3_a. The effect of treatments on weights and measurements of different body organs of pullets of different growth rates.

	G.R. & treat.	Body wt. kg	Thyroid wt. mg	Thymus wt. g	Pituitary wt. mg	Adrenal wt. mg	Ovary wt. g	Oviduct	
								wt. g	leng. cm
High	I	1123	103	2.33	18	244	17	28	34
	II	1138	100	3.00	19	200	31	36	58
	III	1005	198	4.33	26	182	29	30	48
	VI	1065	207	2.66	20	220	28	48	32
	V	1022	122	3.00	14	190	30	25	44
Medium	I	1160	111	3.83	13	148	7	20	18
	II	913	140	3.33	20	155	16	20	44
	III	902	158	4.33	16	183	26	24	45
	IV	885	130	1.83	19	145	23	24	50
	V	925	139	3.50	15	169	19	26	46
	VI	1047	135	2.33	23	197	19	30	38
	VII	1000	200	4.00	22	197	15	17	33
	VIII	947	137	3.00	15	183	5	10	28
	IX	965	163	3.66	19	188	12	20	37
	X	1097	138	2.00	18	163	21	25	41
	XI	877	180	5.00	19	180	14	16	32
low	I	817	124	2.33	18	170	15	11	28
	II	703	108	5.00	14	124	1.25	0.64	7
	III	802	155	5.33	23	186	7	7	20
	IV	770	140	2.50	22	213	3	4	16
	V	877	133	4.00	16	145	15	15	31

As the desiccated gland which was used in this study is another form of thyroxine; feeding such substance to the normal birds of this study showed similar thyroid weights like the controls. However, when it was fed to hypothyroidism birds (sulfa groups) it decreased the weights of thyroid in relation to the controls. This may suggest that thyroxin output may inhibit the gland indirectly by inhibiting the out of pituitary thyrotropic hormone, and when the gland gradually becomes deleted of stored colloids and so, decreased in weight. Stukie (1954), reported that the subcutenous injections of thyroxine to hypo - thyroidism birds produce thyroid weights the same as those of control. This slight difference between our study and Stukie may be related to individual substance used, breeds, doses diets used and environmental condition.

TABLE 3 (b). The effect of treatments on weights and measurements of different body organs of pullets of different growth rates eockerels.

	G & R. Treat.	Body wt. kg	Thyroid wt. mg	Thymus wt. g	Pituitary et. mg	Adrenal wt. mg	Testes wt. g
high	I	1520	162	2.83	27	204	33
	II	1485	94	4.33	23	213	22
	III	1393	195	5.33	22	215	23
	IV	1542	169	2.83	29	248	36
	V	1450	131	5.66	22	215	24
Medium	I	1237	149	2.17	29	260	25
	II	1263	80	5.00	24	254	14
	III	1340	177	6.00	15	202	23
	IV	1400	148	2.83	30	220	31
	V	1207	140	4.50	20	179	18
	VI	1257	134	3.50	22	216	11
	VII	1103	163	4.66	19	218	29
	VIII	1203	120	2.33	27	238	17
	IX	1135	158	3.50	23	212	25
	X	1233	120	2.33	32	175	7
	XI	1170	153	5.00	22	238	24
Low	I	992	119	3.00	20	163	12
	II	1000	73	5.00	28	220	24
	III	1018	127	5.33	18	193	15
	IV	1210	128	4.33	25	245	20
	V	1014	117	5.33	19	221	15

Histological integration

Control group : the thyroid tissue of high and low growth rate contained follicles of compacted epithelial cells. The epithelium of the medium rate of growth group was more obvious and less compacted. The cells of the capsules differed in number greatly in males (Table 6), ranging from 10 to 38, 15 to 40 and 18 to 50 cells for the three groups respectively. These wide ranges were less in females. They were from 21 to 42, 22 to 36 and 11 to 25 for the three groups respectively.

The follicles did not differ greatly in diameter between sexes. However, clear differences were observed between the different growth rates groups. They ranged in diameter from 14 to 54, 30 to 74 and from 16 to 44 microns for the three rates of growth respectively. However, the majority were large follicles for the low growth rate group, small for the high and medium for

the medium growth groups. The follicles were almost spherical avaid but some were tubular or sacculated. The lumen of the low and medium groups were filled with a lot of colloidal substances, whereas, that of fast growing groups contained small colloids. In females of high and low growth rates the follicles colloids were observed to be aggregated inside near the epithelial layer.

TABLE 4. The effect of treatment on relative weights of gonads and endocrines of pullets of different growth rates .

G.R.	Treat.	Carcass %	Thyroid %	Thymus %	Pitutary %	Adrinal %	Ovary %	Oviduct %
High	I	57.17	0.092	2.07	0.160	2.17	1.51	2.49
	II	62.39	0.088	2.63	0.167	1.75	2.72	3.1€
	III	61.39	0.197	4.30	0.259	1.81	2.88	2.98
	IV	59.81	0.194	2.50	0.188	2.06	2.63	4.51
	V	60.37	0.119	2.93	0.137	1.86	2.93	2.45
Medium	I	61.46	0.096	3.30	0.112	1.27	0.60	1.72
	II	63.85	0.153	3.65	0.219	1.69	1.75	2.79
	III	66.85	0.175	4.80	0.177	2.03	2.88	2.66
	IV	58.76	0.147	2.07	0.215	1.64	2.60	2.70
	V	62.70	0.150	3.78	0.162	1.82	2.05	2.81
	VI	56.64	0.129	2.22	0.220	1.88	1.81	2.86
	VII	61.70	0.200	4.00	0.220	1.97	1.50	1.70
	VIII	60.19	0.145	3.17	0.158	1.93	0.53	1.05
	IX	59.09	0.169	3.79	0.197	1.95	1.24	2.07
	X	58.07	0.126	1.82	0.164	1.48	1.11	2.28
	XI	61.91	0.205	5.70	0.217	2.05	1.60	1.82
Low	I	60.34	0.151	2.85	0.220	2.08	1.93	1.35
	II	63.01	0.153	7.11	0.199	1.76	0.98	0.06
	III	65.46	0.193	6.64	0.287	2.32	0.87	0.87
	IV	60.00	0.182	3.25	0.286	2.77	0.39	0.52
	V	53.48	0.152	4.56	0.182	1.65	1.71	1.71

* Milligrams of this endocrine for each 100 g of body weight.

Groups of thyroid treatment

The thyroid tissue of the treated males with all levels of desiccated gland were less compacted than the controls especially in those of high level treatments. The epithelial cells of high and low growth rate females were dark, and elongated

in shape. The epithelial cells were more obvious than the controls in thyroid tissue of medium growth males and females. Follicular epithelial cells were higher in number for males and females treated with high levels of thyroid than those of low levels (Table 6).

TABLE 5. Number of oocytes in the ovaries of hens of different growth rates and different treatments.

G.R.	Treat	Less than 1 mm	From 1 mm to 1 cm	More than 1 cm	Rupture	Total
High	I	452	98	2	1	554
	II	691	190	5	3	889
	III	563	194	6	0	763
	IV	538	136	5	3	682
	V	660	133	5	3	801
Medium	I	453	99	2	0	554
	II	384	130	3	1	518
	III	587	192	5	2	786
	IV	550	134	3	1	688
	V	468	116	3	2	589
	VI	507	155	2	1	665
	VII	473	144	3	0	620
	VIII	401	85	1	1	488
	IX	399	139	5	1	544
	X	484	144	4	2	634
	XI	318	87	3	0	408
Low	I	328	80	2	0	410
	II	206	27	0	0	233
	III	319	102	1	1	423
	IV	291	57	0	0	348
	V	329	101	2	2	434

The same trend was observed in follicles diameter of high and medium growth rate groups. The follicles were spherical in females while they were hexagonal in males. Follicles of low growth rate did not differ in size greatly. Spaces between follicles were large in the high levels and they were filled of intensive connective tissue stroma and inter follicular cells. The largest follicles were shown by the high growth group of high levels. Some follicles contained colloids while, others especially in high group contained no colloids.

TABLE 6. Effect of different treatments on histological estimates in thyroid gland.

G.R.	Treat.	Males			Females		
		Av. Cell No. in each foll.	Av. inner diameter of foll.	N/D ratio	Ac. cell No. in each fool foll.	Av. inner diameter of foll.	N/D ratio
High	1	21.5	50.2	0.43	30.9	66.4	0.47
	II	19.5	45.6	0.45	24.3	43.4	0.56
	III	25.5	79.0	0.32	34.9	74.0	0.47
	IV	14.6	23.8	0.61	33.7	70.0	0.48
	V	29.2	51.4	0.57	20.0	45.2	0.46
Medium	I	28.4	58.2	0.49	29.9	58.0	0.50
	II	22.5	51.0	0.44	23.1	58.0	0.40
	III	29.3	56.4	0.52	21.8	44.2	0.49
	IV	23.7	51.6	0.46	26.2	58.2	0.45
	V	22.1	47.4	0.47	26.6	45.6	0.49
	VI	33.0	68.0	0.48	32.7	68.0	0.48
	VII	33.9	74.2	0.46	28.4	49.0	0.58
	VIII	26.3	47.4	0.55	30.5	58.2	0.52
	IX	18.4	32.6	0.56	34.3	63.1	0.54
	X	31.0	52.0	0.50	23.3	43.0	0.55
	XI	28.5	53.2	0.53	28.6	51.2	0.56
Low	I	25.0	33.6	0.74	23.2	50.4	0.46
	II	25.3	39.4	0.64	20.7	49.2	0.42
	III	20.8	46.4	0.45	19.3	36.6	0.53
	IV	21.9	61.6	0.36	20.1	51.8	0.39
	V	31.2	59.6	0.52	18.5	40.2	0.46

Groups of potassium iodide

The tissue of the gland was less compactness. The high growth rate males and females were observed to have high number of epithelial cells which when the level of treatment was high and low when the level of treatment was low (Table 6). The adverse picture was shown by the thyroid tissue by medium and slow growth rate birds of both sexes. In all the three rates the follicular epethelial cells of both sexes were more evident than those of thyroid treatments.

The follicles were spherical or avaid but some were sacculated especially in males. The very large follicles that were observed by these groups, were obtained within the high growth rate birds wether the level was high or low. In the medium slow growth rate males and females, the large follicles

were observed by the low than the high levels of the treatments. Follicles of medium growth group were filled with colloids, while those of low growth group contained no colloids. The connective tissue of the group that were fed the low levels contained a moderate colloids substances. The tissue of groups were fed KI for a month contained a moderate colloids.

TABLE 7. Analysis of variance for body organs weights as influenced by different treatments and sexes for the three groups of growth.

Items	High		Medium		Low	
	Treat.	Sex	Treat.	Sex	Treat.	Sex
Body wt.	N.S.	,,	N.S.	,,	N.S.	,,
Carcass wt.	N.S.	,,	N.S.	,,	N.S.	,,
Thyroid wt.	,,	N.S.	,,	N.S.	,	N.S.
Thymus Wt.	,,	,,	,,	,	,,	N.S.
Pituit. wt.	N.S.	N.S.	N.S.	,	N.S.	N.S.
Adrenal wt.	N.S.	N.S.	N.S.	,,	N.S.	,
Ovary wt.	N.S.	—	N.S.	—	N.S.	—
Oviduct wt.	N.S.	—	N.S.	—	N.S.	—
Oviduct long	,,	—	N.S.	—	,	—
Testes wt.	N.S	—	,,	—	N.S.	—

N.S.= Not significant.
, = Significant at 5% level of probability.
,, = Highly significant at 1% level of probablity

Groups of sulfa-quanaxalline

All tese groups showed nearly similar picture of thyroid tissue. The epithelial cells of the follicles were more clear and less compacted than the controls. No marked differences were observed in the number of cells between sexes (Table 6). Follicles of the thyroid tissue of these groups were large and did not differ greatly in diameter within each treatment. Most of the follicles were spherical, especially in females. In males, however, some were sacculated, tubular of hexagonal. Some females follicles contained

a moderate quantity of colloid substances. Also, the lumen of the group of low level of sulfa contained colloids.

Activity estimates

Some treated groups showed heavier thyroid weight than their controls (Tables 2 & 3). However, this does not mean that the activity of the thyroid increased in such treatments. When more accurate estimates were used another and true trend of variation was observed (Table 6). Kamar (1961), divided the number (N) of follicular cells by follicle diameter (D) to have the direct and positive relation with thyroid activity. This estimate was used to study thyroidal activity in this work.

In the high growth rate of both sexes, the value of N/D was low for those fed high levels of either thyroid or iodine and *vice versa* with the low levels (Table 6 & Fig. 1).

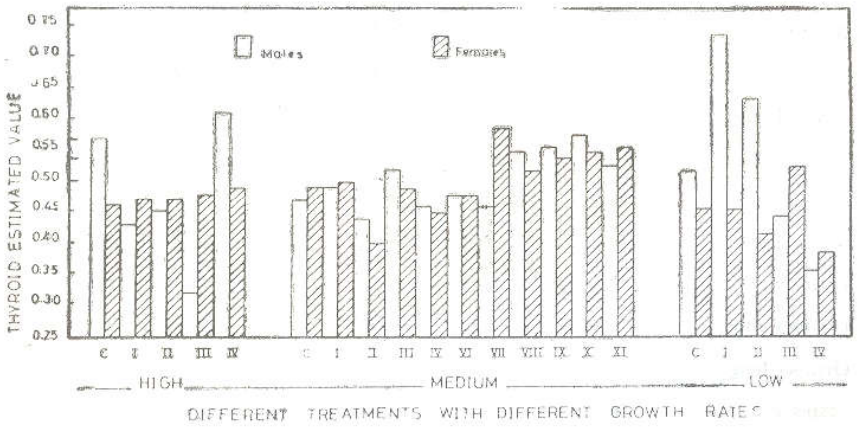

Fig 1. The Effect of Different Treatments on the thyroid Gland Activity

In males only low or mild doses of KI that rise the activity of the gland when the rate of growth was in maximum. Meanwhile, all levels of thyroid and iodine which were used in the fast growing females (less in the rate of growth than males) succeeded to stimulate the thyroid gland activity. Kamar (1961), found that low or mild doses of thyroprotein increased thyroid activity whereas, large doses decreased it.

All the previous finding of high growth males and females were adversely observed by the low rate of growth in both sexes. The highest value of D/N ratio was shown by the groups fed the high levels of either thyroid or iodine and *vice-versa* with respect to low levels. It seems that when the rate of growth is high, the low level of thyroactive substances is sufficient to increase thyroid gland activity, while the high levels were suitable for the low growth birds (Fig. 1).

In medium growth rate birds of both sexes, those received the high levels of thyroid and iodine exceeded those of low levels and the control in the estimated value of N/D. This effect followed the same trend which was previously observed within the low rate of growth birds of the two sexes.

All the groups which were previously treated with sulfa then fed either thyroid or iodine were of higher estimated thyroid activity than their controls However, the values of N/D for the iodide groups were higher than those of thyroids.

Thyroid iodide substances when fed for only one month, showed also higher value of N/D of thyroid activity than the controls (Table 6).

References

Andrews, F.N. and Bohren, B.B.(1947) Influence of thiouracil and stilbestrol on growth, fattening and feed efficiency in broilers. *Poult. Sci.*, **26**. 447.

Carleton, H.M. (1938) "*Histological Techique*" 2nd Edition, Lond, Oxford Univ.

Dangelo, S.A. and Charipper, H.A. (1947) Effect of thiourea on the growth, plumage, and endocrine organs in the fowl. *Anat. Rec.*, **99**, 66.

El-Rakhawy, M.J. (1971) "*Illusrative Histology*" 1st Edition, Al-Ahram Press, Cairo.

Gonzga, A.C. and Nanadiago, R.N. (1955) Studies of some effects of thyroprotein on growing chicks. *Indian Vet. J.* **32**, 207.

Huston, T.M. and Wheeler, R.S. (1949) Effect of syathetic thyroprotein on seasonal variation in volume and concentration of cock semen. *Poult. Sci.***28**, 262.

Kamar, G.A.R. (1961) Hyper-thyroidism on gonads and endocrines of cocks. I-Morphological studies, II-Histological integration. *U.A.R. J. Anim. Prod.* **1**, 83.

Kamar, G.A.R. (1962) Hyper thyroidism effects on body organs of cocks. *The Ind. J. of Vet. Sci.*, **32**, 194.

Lever, J. (1948) A mathematical methods for the determination of the state of activity of the thyroid gland. *Proc. Kon. Ned. Alkad. V. Wetensh., Amesteradam* **51**, 1302.

Mackenzie, C.G. and Mackenzie (1943) The effect of sulfon amides and thioureas on the thyroid gland and basal metabolism. *Endocrinology*, **32**, 185.

McCartney, M.G. and Shaffner, C.S. (1949) Chick throid size and incubation period as influenced by thyroxine, thiouracil and thyroprotein. *Poult. Sci.*, 23,228.

McGaval, T.H. (1951) "*The Thyroid*" Press of C.V. Moby Company, U.S.A.

Mellen, W.J. and Hill, F.W. (1953) Effects of thiouracil, thyroprotein and esrogen upon the basal metabolism and thyroid size of growing chickens. *Poult. Sci.*, **34**, 994.

Moreng, M.M. and Shaffner, C.S.(1948)Anti thiouracil-thyroprotein treatment for fattening poultry. *Poult. Sci.* **28**, 504.

Roberts, E. and Card, L.E. (1947) The use of sulfan amides in the control of pollorum disease. *Poult. Sci.*, **27**, 194.

Shaffner, C.S. and Andrews, F.M. (1947) The influence of thiouracil on smen quality in the fowl. *Poult. Sci.*, **27**, 91.

Stukie, P.D. (1954, 1958) *"Avian Physiologv"*, Comstock Publ. Ass. Ithaca, N.Y., U.S.A.

Tsukunaga, S. and Takahashi, T. (1959) Effect of thyroid stimulating and thyroid inhibiting substance upon the growth of cockerels. *Bul. Hiroshima Agric. Coll.*, **1**, 34.

Turner, C.W., Kempster, H.L. and Hall, N.M. (1946) Effect of continued thyroprotein feeding on egg production. *Poult.. Sci* **25.**, 562.

Voitkevic, A.A. and Kostin, I.A. (1947) The reaction of feather-forming tissue to variation in the activity of the thyroid gland induced by thiouracil injection. *Biull. Cksp. Biol. Med.*, **24**, 161.

Wheeler, R.S. and Hoffman E. (1948) The value of thyroprotein in starting growing and laying rations. I-Growing, feeding and feed consumption of Rhode Island Red *Poult. Sci.*, **27**, 103.

Wheeler, R.S., Hoffmann, E. and Graham, C.L. (1948) The value of thyroprotein in starting, growing and laying rations. II-The growing period 12-24 weeks of age. broilers. *Poult. Sci.*, **27**, 509.

Williams, R.H. (1965) "Text Book of Endocrinlogy", Chapter 4, *3rd.* ed., W.B. Saunders Co., Philadelephia and London.

تأثير اليود والغدة الدرقية على الانتاج والتناسل فى الدجاج
٥ ـ الغدد والغدد الصماء والدراسة الهستولوجية

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أعطت الكتاكيت فى سن ١٨ أسبوع جرعات مختلفة فى الغدد الدرقية واليود بنسب مختلفة وقد أدى ذلك الى زيادة فى وزن الغدة الدرقية فى الطيور المعاملة باليود ونقص فى وزنها بالنسبة للطيور التى غذيت على مسحوق الغدة ٠

كما لوحظ انخفاض بسيط فى أوزان التيموسية ، المبيض ، قناة المبيض وبالنسبة الى نشاط الغدة المقاس هستولوجيا فقد لوحظ أن النسب المنخفضة من المعاملات مناسبة للطيور سريعة ومتوسطة النمو أما البطيئة فقد كانت النسب العالية من المعاملات هى المناسبة لها ٠