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EFFECT OF SPRAYING POTASSIUM IODIDE ON PRODUCTIVE PERFORMANCE, BLOOD PARAMETERS AND IMMUNO-RESPONSE OF TURKEY CHICKS

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ABSTRACT

A total of 120 one day-old Nicholas turkey chicks were divided randomly into six equal groups. The first and second groups were treated with distilled water (once and twice weekly) and served as control (T1 and T2), the third and forth groups (T3 and T4) were treated with 5% potassium iodide (KI) solution once and twice weekly, respectively, while fifth and sixth (T5 and T6) groups were treated with 10% potassium iodide (KI) solution once and twice weekly, respectively. The treatments were spraying over chick heads. The chicks were kept at rearing wire cages, and the feed and water were available *ad libitum*. At 45 days of age ten birds from each group were intramuscularly injected with 0.5 ml of SRBCs. The obtained results showed that chicks sprayed with 10% KI showed the highest LBW and gain ($P<0.05$) at 30, 45 and 60 days of age, followed by 5% KI, while the control showed the lightest weights and gain. LBW and gain of chicks at 60 days of age was higher ($P<0.05$) for spraying once than twice/week. Both KI levels increased ($P<0.05$) WBCs count and blood hemoglobin (Hb) concentration as compared to control. Chicks in 10% KI treatment showed the highest ($P<0.05$) WBCs count and Hb concentration. WBCs count was higher ($P<0.05$) by spraying the chicks twice/week than once/week. RBCs count and Hb concentration were nearly similar as affected by spraying time. Serum total protein (TP) concentration increased ($P<0.05$) with 10% KI as compared to control, but did not differ from that with 5% KI. Globulin (GL) concentration increased ($P<0.05$) and albumin (AL) was not affected by 10% KI. However, AL/GL ratio increased ($P<0.05$) with 5% KI as compared to control, but did not differ from that with 10% KI. There were insignificant differences in AST and ALT activities. Serum T3 concentration was the highest ($P<0.05$) with 10% KI, followed by 5% KI and the lowest in control, respectively. T3 concentration was higher ($P<0.05$) by spraying twice than once/week. Chicks treated with 10% KI showed the highest ($P<0.05$) antibody titer and the lowest ($P<0.05$) lysozyme concentration, followed by 5% KI, while the control showed the lowest antibody titer and the highest lysozyme concentration ($P<0.05$). Spraying twice/week increased ($P<0.05$) antibody titer and decreased lysozyme concentration, reflecting the highest immune response for chicks treated with 10% KI twice/week.

It could be concluded that potassium iodide had positive effect on turkey chicks when used as spraying over heads of growing chicks with 10% once a week.

Keywords: Turkey chicks, iodine, growth performance, blood, immunity.

INTRODUCTION

The importance of iodine as an essential element in animal's diet arises from the fact that it is a major component of the thyroid hormone, tri-iodothyronine (T_3) and, tetra-iodothyronine (T_4) or thyroxine (Ganong, 2001). It has an important effect on thyroid gland (Abd-El-Latif *et al.,* 2001). The thyroid gland contains the highest concentration of iodine (0.2-5% on a dry weight basis) in the body; to be 70-80% of the total body iodine stores. Approximately 90% of the iodine which passes through the thyroid gland is captured by that organ (Hetzel and Welby, 1997). Iodine is combined with tyrosine in the thyroid to form diiodotyrosine, then two molecules of diiodotyrosine are combined to form thyroxine molecule. Approximately 80% of thyroxine in blood circulation is broken down through de-iodination in liver, kidney and other tissues (Gado, 1996).

Thyroid hormones regulate metabolic activity and promote growth. The importance of iodine is considered as limited element for thyroidal hormones (T_3 and T_4) biosynthesis (Magilvery, 1979). Deficiency of dietary iodine can be solve by re-utilization of released iodine from degradation of thyroid hormones (Sturkie, 1986). The mode of action of thyroid hormones could be divided into two general ways, the first is metabolic effects as calorigenesis, regulation transportation of water and ions and regulation of intermediary metabolism; and the second is their growth-promoting developmental action (Hadlley, 1992; McNabb and King, 1993). Thyroid gland cannot synthesize its hormones without adequate amount of iodine in blood. At the same time, inadequate amount of iodine not only reduces activity of thyroid hormone, but also cause hypertrophy of thyroid gland. Thyroid gland consumes about 70-100 µg of iodine daily for hormone synthesis (Turner and Bagna, 1971).

Hamdy and Abd El-Latif,(1999) revealed that supplementing drinking water with potassium iodide (KI) at levels of 300 and 600 ppm improved age of sexual maturity, egg number, egg weight and feed conversion ratio in Japanese quail hens. While adding a level of 900 ppm of KI showed an opposite results in egg number, egg weight, and feed conversion ratio. Other investigators found that KI had antimicrobial effects against wide range of microbes, gram (negative and positive) bacteria species (Cooper, 2007), due to developing of general healthy including immunity and growth performance.

The present study was conducted to investigate the effect of spraying KI on productive performance, blood parameters and immune-response of growing turkey chicks during the first 60 days of age.

MATERIALS AND METHODS

This study was carried out at the Turkey Breeding Station, Mahallet Mousa, Kaferelsheikh Governorate, Animal Production Research Institute, Agricultural Research Center, Egypt.

Birds and feeding system:

A total number of 120 one day-old Nicholas turkey chicks were used in this study. Birds were

divided randomly into six similar groups in wire cages. Water and feed were available *ad. libitum* all times. Birds in all groups were fed commercial diet containing 0.4 mg iodine/kg during 60 days as an experimental period Ingredients and calculated energy and CP contents are shown in Table (1).

Iodine content of feed was determined according to McDowell (2003).

Table (1): Ingredients and calculated energy and CP contents of the basal diet.

Ingredient	Diet from 0-60 days
Yellow corn	60.0
Wheat bran	0.60
Soybean meal (44%)	39.0
Broiler concentrate (50 %)	10.0
Limestone	0.00
Bone meal	0.30
Iodine (mg/kg)	0.4
Premix*	0.10
Total	100
Calculated chemical composition**:	
Metabolizable energy ME (Kcal /kg)	2900
Crude protein (%)	26.90

*** Each 3 kg of vitamins and minerals mixture contain: 12000.000 IU vitamin A acetate; 2000.000 IU vitamin D3; 10.000 mg vitamin E acetate; 2000 mg vitamin K3; 100 mg vitamin B; 4000 mg vitamin B2; 1500 mg vitamin B6; 10 mg vitamin B12 ; 10.000 mg Pantothenic acid; 20.000 mg Nicotininc acid; 1000 mg Folic acid; 50 mg Bioten; 500.000 mg Chorine; 10.000 mg Copper; 1000 mg Iodine; 30.00 mg Iron; 55.000 mg Manganese; 55.000 mg Zinc; and 100 mg Selnium. ** According to NRC, 1994.**

Experimental design:

Six treatments were used in this study. Birds in the control groups (T1 and T2) were subjected to spraying with distilled water once or twice, respectively, while those of treatments T3 to T6 were subjected to spraying over heads with 10 ml (volume of solution) contained 5 or 10% KI once and twice weekly, respectively (Table 2).

Table (2): Experimental design of treatments.

Treatment	No. of birds	Spraying time (KI level/week)
T1	20	Distilled water once a week
T2	20	Distilled water twice a week
T3	20	5% KI* once a week
T4	20	5% KI twice a week
T5	20	10% KI once a week
T6	20	10% KI twice a week

*** KI: Potassium Iodide (a commercial product 2.5% I, diluted with distilled water to obtain 5 or 10% I solutions).**

Experimental procedures:

During an experimental period of 60 days, birds were weighed to record live body weight (LBW) at one day old and biweekly thereafter. Body weight gain (BWG) was calculated at biweekly intervals and during the whole experimental period.

On day 45 of age, 10 chicks from each group were injected intramuscularly with 0.5 ml of 50% sheep red blood cells (SRBC) as T-dependent antigen. Blood samples were collected at the end of the experimental period (60 days of age) and divided into two aliquots. In the first one, count of red blood cells (RBCs) and white blood cells (WBCs) was determined using haemocytometer (Hawkey and Dennett, 1989). Haemoglobin (Hb) concentration was measured according to Drew *et al.* (2004). The second aliquot of blood sample was centrifuged at 3500 rpm for 15 minutes to obtain serum and immediately stored at -20° until analysis. Concentration of serum total protein and albumin as well as activity of asprtate (AST) and alanine (ALT) transaminases were determined coloremetrically using available commercial kits (Bio-Merius, France). Cncentration of serum T_3 was determined by radioimmunoassay (RIA) as described by Darras *et al.* (1992).

Humeral Immune Response was evaluated by haemaglutination (HA) test according to Prescott *et al.* (1982). Titers were measured as log 2 values. Haemaglutination anti-bodies were assessed 7 days later by HA test. Measurement of lysozyme activity was determined according to the method described by Schltz (1987).

Statistical analysis:

Data were subjected to statistical analysis using SAS (1995) according to the following model: $Y_{ijk} = \mu + T_i + F_j + TF_{ij} + e_{ijk}$ Where: Y_{ijk}= the observation of individuals, μ = overall mean, T_i = effect of treatment (Iodine level, 0, 5 and 10%), $F_{j\,=\,effect}$ of spraying time (once or twice weekly), TF_{ij} = effect of interaction between treatments and time, and e_{ijk} = experimental error or residual. Means were separated using Duncan's Multiple Range Test (Duncan, 1955).

RESULTS

Productive performance:

Live body weight:

Data presented in Table (3) showed that the significant ($P<0.05$) effect of KI treatment appeared on LBW of chicks at 30, 45 and 60 days of age. Chicks sprayed at a level 10% KI were significantly ($P<0.05$)

the heaviest at 30, 45 and 60 days of age, followed by those sprayed with 5%, while control chicks showed the lightest weights.

The effect of spraying time on LBW of chicks was not significant at 0, 15, 30 and 45 days of age. However, LBW of chicks at 60 days of age was significantly (P<0.05) higher for spraying once than twice/week. The effect of interaction between treatment and spraying time was significant (P<0.05) at 30, 45 and 60 days of age, reflecting the heaviest LBW of chicks sprayed with KI at a level of 10% for once/week at these ages. However, the least LBW was obtained for those sprayed with water for once/week (Table 3).

Table (3): Live body weight of turkey chicks at different ages as affected by treatment, spraying time and their interaction.

Variable	Live body weight (g) at different ages				
	Day one	Day 15	Day 30	Day 45	Day 60
Effect of treatment (KI level):					
0%	60.63	218.9	1936.8^{c}	2830.9^{c}	3634.8^{c}
5%	60.58	214.7	1978.1^{b}	2973.6^{b}	3879.2^{b}
10%	60.59	220.7	2064.6^{a}	3156.4^{a}	4298.0^{a}
±SEM	0.13	0.33	5.20	39.2	40.80
Effect of spraying time/week:					
Once (O)	60.23	219.2	1997.6	2967.6	4235.0^{a}
Twice (T)	60.96	216.7	1992.4	2974.0	3939.6^{b}
±SEM	0.11	0.29	3.9	32.2	39.1
Interaction between treatment and spraying time: :					
O × 0%	60.13	218.5	1935.7	2821.4	3623
O × 5%	59.30	214.0	1942.7	2964.8	3791.4
O ×10%	61.27	225.2	2114.3	3213.8	4390.0
T × 0%	61.13	219.3	1937.8	2840.6	3645.9
T × 5%	61.86	215.5	2013.5	2982.5	3967.0
T × 10%	59.90	216.1	2025.0	3099.0	4206.0
±SEM	0.13	0.37	5.20	39.30	40.10

a, b and c: Means in the same column for each factor having different superscripts are significantly different (P≤0.05).

Body weight gain:

Data illustrated in Fig. (1) revealed that body weight gain (BWG) was the highest for chicks sprayed with 10% KI, moderate for those sprayed with 5% KI and the lowest for control chicks without KI treatment at all interval studied and during the whole experimental period.

As affected by spraying time, spraying the chicks once/week had no effect on BWG of chicks at all intervals studied, but the effect of spraying for once/week cleared during the whole experimental period (0-60 d of age), whereas chicks sprayed once/week significantly (P<0.05) increased BWG as compared to twice/week (Fig. 2).

The effect of interaction between treatment and spraying time was significant (P<0.05) during the interval from 0 – 60 d, reflecting the highest BWG of chicks sprayed with KI at a level of 10% for once/week (Fig. 3)

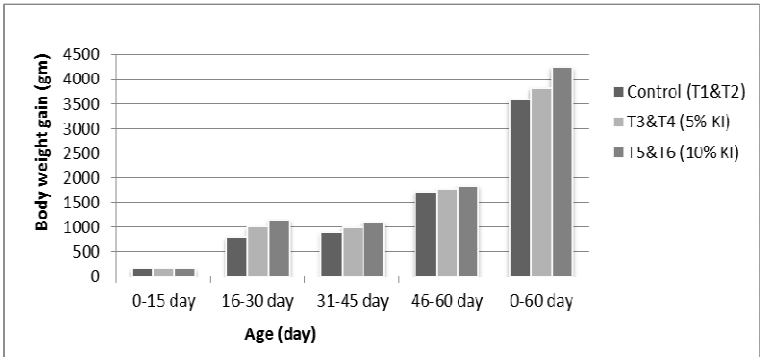

Figure 1: Effect of treatment on body weight gain

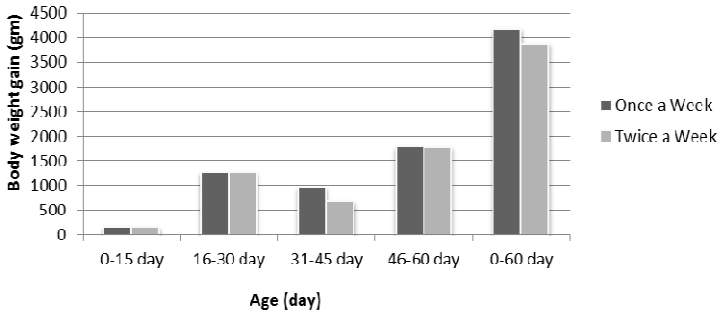

Figure 2: Effect of period on body weight gain

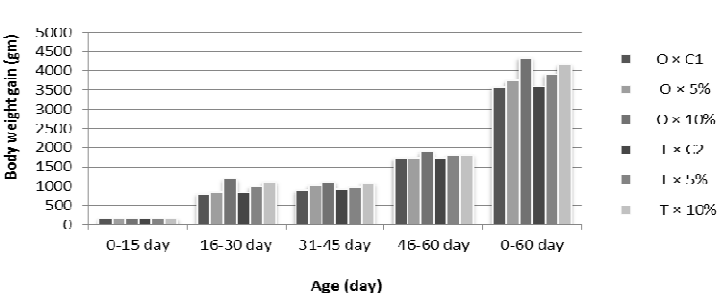

Figure 3: Effect of interaction between treatment and period on body weight gain

Blood components:

Hematological parameters:

Data shown in Table (4) revealed insignificant effect of KI treatment on count of RBCs, but both KI levels significantly (P<0.05) increased count of WBCs and blood hemoglobin (Hb) concentration as compared to control. Treatment with KI at a level of 10% showed significantly (P<0.05) the highest WBCs count and Hb concentration.

The effect of spraying time was significant only on WBCs count. Count of WBCs was significantly (P<0.05) higher by spraying the chicks twice/week than once/week. However, RBCs count and Hb concentration were nearly similar as affected by spraying time (Table 4).

The effect of interaction between treatment and spraying time was significant (P<0.05) on WBC count and Hb concentration. Therefore, chicks sprayed with 10% KI twice/week showed the highest values as compared to other treatments (Table 4).

Table (4): Hematological parameters of turkey chicks as affected by treatment, spraying time and their interaction.

Variable	Hematological parameter		
	RBCs ($x10^6/mm^3$)	WBCs ($x10^3/mm^3$)	Hemoglobin (g/dl)
Effect of treatment (KI level):			
0%	3.49	4.99^c	9.74^b
5%	4.65	5.21^b	10.23^a
10%	4.74	7.01^a	10.67^a
±SEM	0.14	0.18	0.02
Effect of spraying time/week:			
Once (O)	4.31	5.52^b	10.14
Twice (T)	4.26	5.96^a	10.29
±SEM	0.11	0.32	0.10
Interaction between treatment and spraying time: :			
O × 0%	3.50	4.99	9.74
O × 5%	4.64	5.10	10.21
O × 10%	4.80	6.45	10.48
T × 0%	3.48	4.99	9.75
T × 5%	4.65	5.32	10.26
T × 10%	4.67	7.56	10.86
±SEM	0.13	0.16	0.03

a, b and c: Means in the same column for each factor having different superscripts are significantly different (P≤0.05).

Blood serum biochemicals:

Data presented in Table (5) showed significant (P<0.05) increase in serum total protein (TP) concentration only with KI treatment at a level of 10% as compared to control, but did not differ from that with 5% KI. The observed significant increase in TP concentration was associated with significant (P<0.05) increase in globulin (GL) not in albumin (AL) concentration as affected by 10% KI. However, AL/GL ratio significantly (P<0.05) increased with 5% KI as compared to control, but did not differ from that with 10% KI.

It is of interest to note that the effect of spraying time was not significant on concentration of TP, AL, GL and AL/GL ratio. The effect of interaction between treatment and spraying time was insignificant on TP, AL and GL concentrations. This was reflected in similar trend of increase in TP, AL and GL by increasing KI level either by spraying once or twice/week, being the highest for chicks treated with 10% KI twice/week. However, the effect of interaction between treatment and spraying time on AL/GL ratio was significant (P<0.05), reflecting the highest AL/GL ratio for chicks treated with 5% KI once/week (Table 5).

Table (5): Biochemical parameters in blood serum of turkey chicks as affected by treatment, spraying time and their interaction.

Variable	Blood serum biochemical			
	Total protein (g/dl)	Albumin (g/dl)	Globulin (g/dl)	Albumin/globulin ratio
Effect of treatment (KI level):				
0%	4.11^{b}	2.44	1.67^{b}	1.46^{b}
5%	4.53^{ab}	2.84	1.69^{b}	1.68^{a}
10%	4.78^{a}	2.92	1.86^{a}	1.57^{ab}
±SEM	0.14	0.18	0.02	0.04
Effect of spraying time/week:				
Once (O)	4.35	2.72	1.63	1.67
Twice (T)	4.60	2.73	1.87	1.46
±SEM	0.11	0.32	0.10	0.13
Interaction between treatment and spraying time: :				
O × 0%	4.12	2.42	1.70	1.42
O × 5%	4.32	2.85	1.47	1.94
O × 10%	4.60	2.87	1.73	1.66
T × 0%	4.10	2.47	1.63	1.51
T × 5%	4.74	2.83	1.91	1.48
T × 10%	4.96	2.89	2.07	1.40
±SEM	0.13	0.16	0.03	0.02

a, b and c: Means in the same column for each factor having different superscripts are significantly different (P≤0.05).

Enzyme activity and T3 concentration:

Results presented in Table (6) showed insignificant differences among treatments in AST and ALT activities. However, serum T3 concentration was significantly (P<0.05) the highest in chicks treated with 10% KI, followed by those treated with 5% KI and the lowest in control, respectively.

The effect of spraying time was also significant (P<0.05) only on T3 concentration, being higher by spraying the chicks twice than once/week. As affected by insignificant interaction between treatment and spraying time, chicks treated with 10% KI twice/week showed the lowest AST and ALT activities and the highest T_3 concentration in blood serum (Table 6).

Table (6): Activity of transaminases (AST and ALT) and T3 concentration in blood serum of turkey chicks as affected by treatment, spraying time and their interaction.

Variable	AST (U/L)	ALT (U/L)	T_3 (ng/dl)
Effect of treatment (KI level):			
0%	11.96	2.57	72.05^{c}
5%	11.84	2.28	73.83^{b}
10%	11.16	2.01	82.30^{a}
±SEM	0.14	0.18	0.12
Effect of spraying time/week:			
Once (O)	11.76	2.44	74.21^{b}
Twice (T)	11.56	2.14	77.91^{a}
±SEM	0.17	0.15	0.10
Interaction between treatment and spraying time: :			
O × 0%	11.98	2.57	72.13
O × 5%	11.86	2.45	74.31
O × 10%	11.44	2.29	76.19
T × 0%	11.95	2.55	71.98
T × 5%	11.82	2.11	73.35
T × 10%	10.88	1.74	88.42
±SEM	0.13	0.16	0.03

a, b and c: Means in the same column for each factor having different superscripts are significantly different (P≤0.05).

Immune response:

Results shown in Table (7) revealed that chicks treated with 10% KI showed significantly (P<0.05) the highest antibody titer (log_2) against sheep red blood cells (SRBC's) and the lowest lysozyme concentration, followed by those treated with 5% KI, while the control chicks showed significantly (P<0.05) the lowest antibody titer and the highest lysozyme concentration.

Spraying chicks twice/week significantly (P<0.05) increased antibody titer and decreased lysozyme concentration. Accordingly, the insignificant interaction between treatment and spraying time on both parameters reflected the highest immune response for chicks treated with 10% KI twice/week (Table 7).

Table (7): Immune response of turkey chicks as affected by treatment, spraying time and their interaction at different ages.

Variable	Antibody titer	Lysozyme (µmol/ml)
Effect of treatment (KI level):		
0%	3.73[c]	85.26[a]
5%	4.95[b]	82.90[b]
10%	5.30[a]	80.21[c]
±SEM	0.04	0.22
Effect of spraying time/week:		
Once (O)	4.33[b]	85.12[a]
Twice (T)	4.97[a]	80.46[b]
±SEM	0.03	0.10
Interaction between treatment and spraying time: :		
O × 0%	3.70	88.76
O × 5%	4.50	84.60
O × 10%	4.80	82.00
T × 0%	3.75	81.76
T × 5%	5.40	81.20
T × 10%	5.80	78.42
±SEM	0.02	0.43

a, b and c: Means in the same column for each factor having different superscripts are significantly different (P≤0.05).

DISCUSSION

The current study aimed to evaluate the effect of spraying potassium iodide (KI) on productive performance, blood parameters and immune response of growing turkey chicks during the first 60 days of age. The obtained results indicated heaviest LBW and gain of chicks treated with KI at both levels, being significantly (P<0.05) higher with KI at a level of 10% than 5%. Such results may be due to the important role of iodine in the metabolism and growth, since it has a direct effect on regulation of some metabolic hormones such as thyroid hormones (Magilvery, 1979; El-kaiaty *et al.,* 2004). It is well known that the iodine deficiency causes a low level of T_4 and T_3 in poultry (Guo, 1999), pigs (Schone *et al.,* 1988), rats (Fang, 2000) and humans (Orville *et al.,* 2000). Thyroid hormones are synergistic to growth hormone and there are many actions of thyroid hormones mediated to stimulation of cellular protein synthesis (Hinkle and Kinsella, 1986; Abd El-Latif *et al.*, 2001). In this respect, Fabris (1973) observed that iodine deficiency had a reverse effect on the rat's lymphocytes function. Also, Bagchi *et al.* (1985) explained that excessive consumption of iodine may be responsible for the increased incidence of autoimmune thyroiditis in chickens. They found that administration of iodine during the first 10 weeks of life increased the incidence of auto antibodies to triiodothyronine, thyroxine and thyroglobulin, therefore improve growth rate. Moreover, Vorotnitskaya *et al.* (1989) reported that all trace elements mixture affecting live weight gain, feed utilization. Other investigators found that KI had antimicrobial effects against wide range of microbes, gram negative-positive bacteria species, due to developing of general healthy condition that led to enhance growth performance (Cooper, 2007).

It is worthy noting that the observed improvement in LBW and gain of chicks treated with 10% KI was associated with insignificant increase in RBCs count and significant (P<0.05) increase in WBCs count and Hb concentration. Also, this was attributed to significant (P<0.05) increase in total protein and globulin in blood serum. Although, El-Kaiaty *et al.* (2004) found that AST and ALT significantly decreased by iodine treatment in ducks, the present results indicated insignificant reduction in AST and ALT activities by KI treatment at both levels. These finding may indicate normal liver function of chicks treated with KI.

Lysozymes are proteins of low molecular weight found in polymorphnuclear leukocytes and mononuclear cells. They are present in all tissue fluids except cerebro spinal fluid, sweat and urine. Lysozymes are considered as a member of the innate humoral factors that elaborated from the body and showed a dramatic increase in concentration in response to infection or tissue injury (Weir, 1983). The effect of iodine on increasing the antibody titer and decreasing lysozyme concentration may be attributed to an indirect effect on the immune system, whereas chicks treated with KI were highly producer of antibody to SRBC's and reduced lysozyme concentration. Accordingly these birds had better immunological responsiveness than control birds. KI may preferentially affect cell-mediated

immune response relative to development of lymphoid organs and antibody production, because iodine may act by altering antigen presentation by the thyroid epithelial cells modifying the function of thyroid targeted immune cells or by other mechanisms (Bagchi *et al.,* 1985; Sonsovskaya, 1999). Also, thyroid hormones are known to influence the function and development of lymphoid organs (Paavonen, 1982).

It could be concluded that potassium iodide had positive effect on turkey chicks when used as spraying over heads of growing chicks with 10% twice a week.

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تأثير الرش بيوديد البوتاسيوم على الأداء الإنتاجى وقياسات الدم والاستجابة المناعية لكتاكيت الرومى

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أستخدم فى هذا البحث عدد ١٢٠ كتكوت نيكولاس عمر يوم، قسمت عشوائيا إلى ستة مجاميع متساوية بكل منها ٢٠ كتكوت. المجموعة الأولى والثانية عوملت بالماء المقطر مرة واحدة أو مرتين أسبوعيا كمجموعات مقارنة بينما عوملت المجاميع الأربعة الأخرى بمحلول بوديد البوتاسيوم بكمية ١٠مل (بتركيز ٥% أو ١٠% رشا بطريقة الرذاذ فوق رأس الكتاكيت) وذلك بواقع مرة واحدة أو مرتين أسبوعيا على التوالى. تم تربية الكتاكيت فى بطاريات من السلك وكان الغذاء والماء متوفر دائما بصورة حرة. وعند عمر ٤٥ يوم تم حقن ١٠ كتاكيت ٠.٥مل من سيرم دم الأغنام عضليا.

وكانت أهم النتائج كما يلى:

أظهر رش الكتاكيت بـ ١٠% بوديد البوتاسيوم زيادة معنوية لوزن الجسم الحى والزيادة فى وزن الجسم عند ٣٠, ٤٥ و ٦٠ يوم من العمر يلى ذلك المعاملة بيوديد البوتاسيوم بنسبة ٥%, بينما أظهر الكنترول إنخفاض فى وزن الجسم الحى والزيادة فى الوزن. عند عمر ٦٠ يوم من العمر أظهرت المعاملة بالرش مرتين أسبوعياً زيادة فى وزن الجسم ومعدل الزيادة فى الوزن عن الرش مرة واحدة أسبوعياً. جميع مستويات بوديد البوتاسيوم أظهرت زيادة فى عدد كرات الدم البيضاء وتركيز الهيموجلوبين فى الدم مقارنة بالكنترول. أظهرت الكتاكيت المعاملة بالرش بيوديد البوتاسيوم بنسبة ١٠% زيادة معنوية فى عدد كرات الدم البيضاء وتركيز الهيموجلوبين. كرات الدم البيضاء كانت أعلى معنوياً برش الكتاكيت مرتين/أسبوع عن تلك التى تم رشها مرة/أسبوع. عدد كرات الدم الحمراء وتركيز الهيموجلوبين كان متشابهاً تقريباً متأثراً بوقت الرش. تركيز البروتين الكلى إزداد معنوياً بالمعاملة بنسبة ١٠% بوديد البوتاسيوم مقارنة بالكنترول, ولكن لم يختلف عن المعاملة بنسبة ٥% بوديد البوتاسيوم.

إزداد تركيز الجلوبيولين معنوياً والألبيومين لم يتأثر بالمعاملة بنسبة ١٠% بوديد البوتاسيوم. بينما إزداد نسبة الألبيومين/جلوبيولين معنوياً بالمعاملة بنسبة ٥% بوديد البوتاسيوم مقارنة بالكنترول, لكن لم تختلف عن المعاملة ب ١٠% بوديد البوتاسيوم. لم يكن هناك فروق معنوية فى نشاط أنزيمات ALT و AST . تركيز هرمون T_3 كان الأعلى بالمعاملة بوديد البوتاسيوم ١٠%, يلية ٥% بينما الأقل كان فى الكنترول على التوالى.

تركيز هرومن T_3 كان الأعلى بالرش مرتين أسبوعياً عن الرش مرة واحدة. الكتاكيت المعاملة ب ١٠% بوديد البوتاسيوم أظهرت الأعلى فى مستوى الأجسام المناعية والأقل معنوياً فى تركيز Lysozyme .

الرش مرتين أسبوعياً إزداد مستوى الأجسام المناعية معنوياً وإنخفض تركيز Lysozyme, مما يعكس أعلى إستجابة مناعية للكتاكيت المعاملة ب ١٠% بوديد البوتاسيوم مرتين/أسبوعياً.

من تلك النتائج يمكن تلخيص ذلك بوديد البوتاسيوم لة تأثير إيجابى على كتاكيت الرومى عند الرش على رأس الكتاكيت النامية بمعدل ١٠% مرتين كل أسبوع.