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THE EFFECT OF IODINE AS A WATER DISINFECTANT AND GROWTH STIMULANT OF BROILERS

By

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SUMMARY

This experiment was carried out to study the effect of iodine on the microbial load of drinking water of broilers as well as on their performance. The experiment was done on 300 Arbor acres one-day-old chicks, the chicks were classified into 6 groups "A_1, B_1, A_2, B_2, A_3 and B_3" each of 50 birds at the age of 21 days, the group A_2 and B_2 drink water contains 10 ppm active iodine, while group A_3 and B_3 drink water contains 25 ppm active iodine, but group A1 and B1 were left without treatment. The groups A_1, A_2 and A_3were vaccinated against ND (booster dose at 37 day old) while group B_1, B_2 and B_3 were left without revaccination. The obtained results revealed that the birds drank water containing iodine showed high performance, general healthy conditions and low incidence of infections as compared to those drank water free from iodine.

INTRODUCTION

Today poultry industry needs not only vaccination programmes but also a hygienic procedures in order to keep the flocks in healthy conditions.

Disinfection is essential procedure for disease control during the rearing of birds specially when these birds are kept under intensive housing system.

One of the most practicable disinfectant used for disinfection of drinking water is iodine (Michael and Roger 1958). It is widely effective against a variety of poultry pathogens (Anon, 1965; Kelsy and Mauer, 1972 and Gerschenfeld, 1977).

The combination of iodine with a solubilizing agent that slowly liberate free iodine when diluted with water is highly recommonded (Zander (1984). Also iodine has a growth stimulating effect (Dhillon et al., 1982; and El-Agrab, 1991) as well as it is an essential element in poultry nutrition (Krueger et al., 1981).

Despite numerous reports on the use of iodine as a growth stimulant few attempts have been made to examine its action on the immune response of the bird. Therefore, this work was planned to investigate the effect of iodine in drinking water as a disinfectant and growth stimulant on broilers (Schwartz, 1977).

MATERIAL AND METHODS

This work was conducted in Dept. of Hygiene and Animal Ethology, Fac. of Vet. Med., Cairo University.

Experimental Birds :

Three hundred apparantly healthy, white "Arbor Acres" one-day-old chicks wre obtained from El-Salam Poultry Company and reared under complete hygienic conditions on deep litter system.

Rearing place and vaccination program:

The chicks were housed in an open built up litter house, the house was thoroughly cleaned and disinfected prior to receiving the chicks. the floor of the house was covered by a uniform layer of

finely chopped wheat straw (10-12 cm) thickness. The temperature and relative humidity inside the house were thermostatically controlled all over the experiment and acording to the recommended standards. At the age of one week, the birds were vaccinated against ND using Hitchner B_1 as double dose in drinking water, also vaccination of the birds against Gumboro disease were done twice "double dose" at the age of 12 and 20 days, respectively.

Watering and feeding system:

The birds were received clean treated water through the manual bell shaped drinkers of 4 litre capacity. Feeding was available ad-libitum through rounded feeders enough to provide a feeding space of 6 cm/bird. The chicks were fed on a commercial starter ration till the age of 21 days, then a grower ration till the end of 5th week, after which the finisher ration was used till the end of the experimental period. All three types of rations were obtained from El-Salam Poultry Company.

Experimental work:

The chicks were housed on deep litter system from day old till the age of 21 days. At the age of one week the birds were vaccinated against Newcastle disease using Hitchner B_1 as double dose in drinking water then chicks were revaccinated with la sota strain at the age of 21 days and divided into six gorups "A_1, B_1, A_2, B_2, A_3 and B_3" each of 50 birds, the gorups seperated by a complete partitions made from wood and wire net, the stocking density was dept at 10 birds/m^2.

Revaccination against ND was carried out at the age of 37 days for groups (A_1, A_2 and A_3) using la sota strain in double dose via drinking water while groups (B_1 B_2 and B_3) were left without revaccination. Starting from the age of 4th week. The groups A_2 and B_2 drink water containing 10 ppm active iodine, and the group A_3 and B_3 drink water containing 25 ppm active iodine "Crown-chemical Company, limited-Amberhurst Kent), while the group A_1 and B_1 were left without treatment of water.

Water sampling:

A sample of 1 litre was collected weekly from several drinkers for each group in a sterile glass flask immediately after addition of iodine "0 hour" then after 6 and 12 hours postreatment (El-Agrab, 1991). The samples were transferred to the laboratory without delay for bacteriological studies.

Bacteriological examination:

The total bacterial count "T.B.C.", total coliform count "T.C.C." and total mould and yeast count were carried out on each collected water sample using the method described by (A.P.H.A., 1989).

Bird performance:

A random sample of 10% of each group was collectively weighed weekly to obtain the average body weight and the weekly weight gain "gm/bird". The average feed intake was also recorded weekly "gm/bird" and the feed utilization efficacy "FUE" was calculated according to Absiekong (1988). The modified European Performance Factor 'MEPF" was calculated acording to the formula

$$\text{"MEPF"} = \frac{\text{Final body weight (Kg x 10000}}{\text{Av. FUE x rearing period/day}}$$

(Sainsbury, 1986).

Where:

Values < 130 indicate poor performance.
Values from 130-150 indicate averag performance.
Values over 150 indicate good performance.
Mortalities of birds were recorded weekly.

The results were tabulated in table (1 and 2) an Fig. (1).

RESULTS AND DISCUSSION

The effect of iodine as a disinfectant for wate

Table (1): Effect of iodine treatment on the microbial load of the drinking water

Bacteriological Examiantion	Time in hrs	Croul group			Iodine treated (10 ppm)			Iodine treated (25 ppm)		
		Age in weeks			Age in weeks			Age in weeks		
		4	5	6	4	5	6	4	5	6
Total Bacterial count	0	$24x10^{10}$	$65x10^{10}$	$96x10^{10}$	$13x10^{9}$	$19x10^{9}$	$35x10^{10}$	$12x10^{8}$	$8x10^{8}$	$28x10^{9}$
	6	$13x10^{9}$	$95x10^{10}$	$113x10^{10}$	$10x10^{7}$	$16x10^{7}$	$22x10^{8}$	$1x10^{7}$	$6x10^{7}$	$27x10^{7}$
	12	$15x10^{10}$	$95x10^{10}$	$109x10^{10}$	$4x10^{6}$	$9x10^{6}$	$21x10^{7}$	$2x10^{5}$	$10x10^{5}$	$16x10^{6}$
Total coliform count	0	$13x10^{4}$	$23x10^{4}$	$36x10^{4}$	$6x10^{4}$	$19x10^{4}$	$32x10^{4}$	$4x10^{4}$	$12x10^{4}$	$20x10^{4}$
	6	$4x10^{4}$	$36x10^{4}$	$14x10^{4}$	$3x10^{4}$	$9x10^{4}$	$14x10^{4}$	$4x10^{3}$	$8x10^{3}$	$13x10^{3}$
	12	$4x10^{4}$	$34x10^{4}$	$36x10^{4}$	$1x10^{4}$	$1x10^{4}$	$9x10^{4}$	$2x10^{3}$	$6x10^{3}$	$12x10^{3}$
Total mould and yeast count	0	$6x10^{9}$	$19x10^{9}$	$32x10^{9}$	$6x10^{9}$	$14x10^{9}$	$30x10^{9}$	$2x10^{8}$	$9x10^{8}$	$19x10^{9}$
	6	$4x10^{8}$	$22x10^{9}$	$36x10^{9}$	$3x10^{7}$	$9x10^{8}$	$21x10^{8}$	$2x10^{7}$	$9x10^{7}$	$13x10^{8}$
	12	$3x10^{7}$	$25x10^{9}$	$28x10^{9}$	$28x10^{6}$	$12x10^{6}$	$9x10^{7}$	$1x10^{5}$	$8x10^{5}$	$18x10^{6}$

Table (2): Effect of iodine treatment on performance characters in broilers.

Water treated group	Age in Weeks	Av.weekly food intake/ bird/gm	Av.weekly weight gain/gm	FUE	Mortalities		MEPF
					No.	%	
Group A_1	4 5 6	543.7 671.0 741.0	276.0 325.0 406.0	1.83	4	8	164.8
Group B_1	4 5 6	549.2 674.4 756.0	311.0 315.0 400.0	1.89	5	10	164.5
Grou p A_2	4 5 6	537.0 658.0 750.0	271.0 391.0 398.0	1.88	4	8	166.6
Group B_2	4 5 6	540.0 665.0 798.0	284.0 392.0 420.0	1.90	4	8	169.2
Grou p A_3	4 5 6	538.0 650.0 738.0	189.0 220.0 450.0	1.64	4	8	165.9
Group B_3	4 5 6	529.0 662.0 730.0	208.0 371.0 448.0	1.63	5	10	165.5

FUE = Feed Utilization Efficacy
MEPF= Modified European Performance Factor.
A_1, A_2, A_3 = vaccianted gorups.
B_1, B_2, B_3= non-vaccinated gorups.
A_2 and B_2 = iodine treated "10 ppm"
A_3 and B_3= iodine treated "25 ppm".

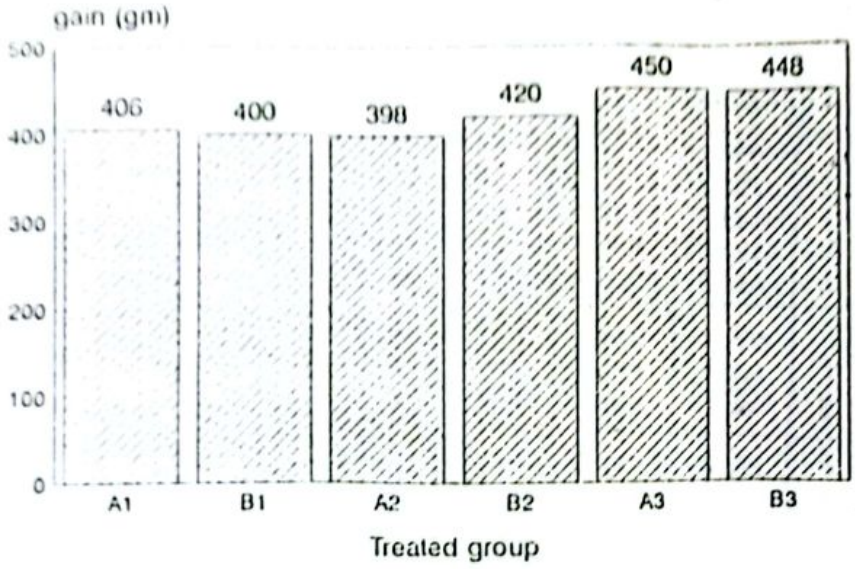

Fig. (1): Average final body weight gain (gm) at 6 weeks of age of broiler as affected by iodinated water

was clear (Table 1) as the concentration of 10 ppm resulted in obvious reduction on the total bacterial count as compared with the control gorup.

The use of iodine in a concentration of 25 ppm results in a reduction of the microbial count better than those reported on its using in a concentration of 10 ppm, however, both concentrations (10 and 25 ppm) fail to produce a complete reduction. This may be attributed to the presence of organic matter which increased by the age of bird and hinder the effect of iodine as a disinfectant (Williams 1980).

Concerning the disinfecting power of iodine on other microbial counts "total coliform, and total mould and yeast counts" (Table 1) showed that the concentration of 25 ppm is still produce a marked reduction in these counts nearly similar to those recorded for total bacterial count as compared to those reduced for the control gorup.

Regarding (Table 2) and Fig. (1) the mortalities recorded in different treated gorups were nearly equal, however, vaccinated and non-vaccinated groups were also showed the same results, this may reflect the efficancy of iodine in drinking water and general health condition of the flock which in accordance with those reported by (Change and Morris (1953) who reported that iodine compounds had satisfactory effect against Pathogenic microorganisms.

The results tabulated in Table (2) showed also that feed utilization efficacy "FUE" in group B_2 (1.90) is better than gorup B3 (1.63) as compared with the control gorup B1 (1.89). These values were nearly similar to the values recorded for the vaccianted goups A_2, A_3 and A_1 which were (1.88, 1.64 and 1.83), respectively.

In addition to that the results recorded in Table (2) cleared that, the modified European Performance Factor 'MEPF" values in different treated gorups were nearly similar as compared with the control gorups. The obtained results agree with those reported by (Genarosoffieti, 1978 and Stanley et al., 1984).

Iodine appeared to be a good disinfectant and growth stimulant agent in broiler farm, as it played a great role as a viricide when reach the respiratory system and act as a barrier against many bacterial and viral infection including Newcastle disease virus.

This is a primary trial to avoid vacciantion of birds against Newcastle disease at the last third period of rearing. This may avoid many

complications during this period as vaccination stress and affection with CRD, therefore the researchers eger to applicated this point on large scale exaperiment.

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