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observed during any of the three periods of the study in daily feed consumption and conversion. The performance index was significantly ($P<0.01$) higher in growing rabbits of the trough drinker than those of nipples. The same result was observed for viability percentage during the second period. The observed higher viability rate for rabbits of the trough drinkers may reflect a more efficiency of such watering system, making it more easier for rabbits to get their water requirements. Branton et al. (1986) reported a high negative correlation between water consumption and mortality rate, and this supports the present results. Similarly, Andrews and Harries (1975) found that broiler chicken weight was heavier when used the trough system than when used nipples.

Concerning the social behaviour, it was observed that the fight % (scratching and biting) was significantly ($P<0.05$) higher for growing rabbits of nipples than those on troughs, the same result was observed for chase behaviour, but the difference was not significant between nipple and trough groups. On the other hand the mutual grooming and resting with contact (% of rabbits) increased for growing rabbits on trough drinkers as compared to those rabbits on nipples, this increase was significant ($P<0.05$) for resting with contact only. The high fight rate exhibited by the growing rabbits on nipples may be due to stress which originated from the competition on nipples during drinking since each cage with one nipple was lodging five rabbits.

It was observed that the thyroxine (T4) hormone level was not significantly affected by watering systems used.

It could be concluded that the low level of iodine (5 ppm) in drinking water was of favourable effect on the growth performance, carcass weight and the social behaviour of rabbits. It is also evident that rabbits can tolerate the salinity of ground water used (910 ppm) without deterioration effects on their growth performance and social behaviour. It is evident also that the clay trough drinkers have a favourable effect on the growth performance and social behaviour.

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Table 4. Averages of growth performance, social behaviour frequencies, carcass traits and thyroxine (T_4) level in blood serum of growing NZW rabbits as affected by watering system.

Items	Non-iodine treated tap water through nipples (A)	Non-iodine treated tap water through trough drinkers (B)	Difference (A-B)
Growth Performance			
4-8 weeks of age (1st growing period) :			
No. of animals at 4 weeks	20	20	
Initial body weight at 4 weeks	539.50±39.74	534.70±37.99	4.8
Body weight at 8 weeks of age (gm)	1106.00±40.61	1141.00±41.92	-35
Daily body weight	20.23±1.41	21.65±1.33	-1.42
Daily water intake (ml)	129.31±11.42	145.10±6.13	-15.79
Daily feed consumption (gm)	88.14±9.52	81.46±6.17	6.68
Feed conversion (gm fed /gm. gain)	4.36	3.76	0.6
Viability (%)	100	100	0.0
Performance Index (%)	25.37±1.70	30.35±1.31	-4.98*
8-12 weeks of age (2nd growing period)			
No. of animals at 8 weeks	20	20	
Body weight at 12 weeks of age (gm)	1886.3843.05	1981.14±43.61	105.24
Daily body gain (gm)	27.872.11	30.01±1.92	-2.14*
Daily water intake (ml)	161.24±13.53	195.69±10.14	-34.45*
Daily feed consumption (gm)	123.13±15.71	112.09±12.87	11.04
Feed conversion (gm feed/gm gain)	4.42	3.74	0.68
Viability %	90	95	-5**
Performance Index (%)	42.68±1.94	52.97±1.50	-10.29*
12-16 weeks of age (3rd growing period)			
No. of animals at 12 weeks	18	19	
Body weight at 16 weeks of age (gm)	2416.61±45.85	2601.72±46.09	-185.11**
Daily body gain (gm)	18.941.10	22.16±1.14	-3.22*
Daily water intake (ml)	190.13±9.46	218.76±10.58	-28.63
Daily feed consumption (gm)	137.32±16.73	131.68±17.82	5.64
Feed conversion (gm feed/gm gain)	7.25	5.94	1.31
Viability (%)	100	100	0**
Performance Index (%)	33.33±1.81	43.80±1.63	-10.47**
Social behaviour			
Cashe (% of rabbits)	16.70±4.30	11.31±2.50	5.39*
Fight (scratching and biting)	11.92±2.34	6.54±1.06	5.38
Mutual grooming (% of rabbits)	21.15±5.03	27.78±5.83	-6.63*
Resting with contact (% of rabbits)	36.20±5.61	52.92±5.86	-16.72
Carcass traits			
Preslaughter weight (gm)	2247.50±26.29	2435±23.09	-187.5**
Hot carcass weight (gm)	1180.83±40.96	1295.83±21.46	-115**
Carcass weight+ (gm)	1409.27±44.63	1558.09±24.36	-148.82**
Dressing %	62.70±3.81	63.99±4.27	-1.29
Liver (gm)	73.33±2.79	85.00±2.04	-11.67**
Head (gm)	124.5±1.12	145.33±2.11	-20.83**
Heart (gm)	7.59±0.67	7.47±0.29	0.12
Kidney (gm)	23.02±1.76	24.46±1.41	-1.44
Spleen (gm)	1.80±0.17	1.52±0.06	0.28**
Blood (gm)	80.83±3.07	73.33±2.79	7.50
Gastrointestinal tract (gm)	339.17±15.67	349.17±19.25	-10.0
Thyroxine level :			
Thyroxine (T_4) (ng/ml)	26.71±1.10	26.95±1.30	-0.24

* Significant at $P < 0.05$ ** Significant at $P) < 0.01$

\+ Carcass weight = weights of hot carcass, head , liver, heart and kidney.

and head between rabbits drank either natural saline or desalinated well water and those received fresh nile water. Ayyat *et al.* (1991) observed that rabbits which drank water containing 3000,4500 and 6000 ppm of salts were significantly lighter in carcass weight than those drank water containing 1500 ppm of salt, on the other hand, the same authers noted that the high levels of salts (4500 and 6000 ppm) in drinking water caused a significant decrease in kidney weight. They found also that dressing percentages decreased with the increasing of water salinity which appear to be in agreement of the present results.

Daily water intake significantly increased ($P<0.01$) in the rabbits that drank the ground water over the tap water group. Ahmed *et al.* (1989) found the same trend in sheep, where drinking a high level of saline water increased water intake, which appeared to be mostly used to excrete the most anions and cations through increased water output.

The viability percentages were not affected during the first and the third periods (4-8, 12-16 weeks of age) but during the 2^{nd} ($8\text{-}12^{th}$ weeks)period the viability percentage was higher in tap water group. The best performance index was recorded also with rabbits drank tap water, but this increase was not significant.

Concerning the social behaviour, it was found that there was no significant difference between rabbits drank tap water and those drank ground water.

Concerning the effect of tap and ground water on thyroxine (T4) level, it was observed that changes in thyroxine (T4) concentration in serum was insignificantly decreased in the rabbits drank ground water.

Comparing the obtained results of chemical analysis of tap and ground water with guideline value (W.H.O., 1984) in Table (1), it was found that no samples exceeded the guideline value except the sodium, chloride and nitrate contents in ground water and nitrate content in tap water. According to W.H.O. (1971), the presence of nitrates in drinking water at concentrations greater than 45 ml/l represents a health hazard. This may suggest the safety of ground water used in this study.

3-Effect of watering system:

The comparison of the two watering systems (nipples and trough drinkers) showed that at the end of the experiment body weight, daily body weight gain, daily water consumption and performance index as well as weights of preslaughter, hot carcass, carcass weight, liver and head for rabbits of the nipple group were significantly ($P<0.05$ or $P<0.01$) lower than those of the trough drinker group (Table 4). No significant differences were

Table 3. Averages of growth performance, social behaviour frequencies, carcass traits and thyroxine (T_4) level in blood serum of growing NZW rabbits as affected by non-iodine treated tap and ground water through nipples.

Items	Non-iodine-treated tap water through nipples (A)	Non-iodine treated ground water through nipples (B)	Difference (A-B)
Growth Performance			
4-8 weeks of age (1st growing period) :			
No. of animals at 4 weeks	20	20	
Initial body weight (gm)	539.50±39.74	532.50±37.73	7.0
Body weight at 8 weeks of age (gm)	1106.00±40.61	1039.50±39.94	66.5
Daily body gain (gm)	20.23±1.41	18.11±1.23	2.12
Daily water intake (ml)	129.31±7.42	159.26±8.51	-29.95**
Daily feed consumption (gm)	88.14±9.52	86.36±10.60	1.78
Feed conversion (gm fed /gm. gain)	4.36	4.77	-0.41
Viability (%)	100	100	0.0
Performance Index (%)	25.37±1.70	21.79±1.82	3.58
8-12 weeks of age (2nd growing period) :			
No. of animals at 8 weeks	20	20	
Body weight at 12 weeks of age (gm)	1886.38±43.05	1808.00±42.12	78.38
Daily body gain (gm)	27.87±2.11	27.45±1.98	0.42
Daily water intake (ml)	161.24±8.53	196.86±8.98	-35.62**
Daily feed consumption (gm)	123.13±15.71	117.57±14.83	5.56
Feed conversion (gm feed/gm gain)	4.42	4.28	0.14
Viability %	90	85	5
Performance Index (%)	42.68±1.94	42.24±1.54	0.44
12-16 weeks of age (3rd growing period) :			
No. of animals at 12 weeks	18	17	
Body weight at 16 weeks of age (gm)	2416.61±45.85	2301.33±43.75	115.28
Daily body gain (gm)	18.94±1.10	17.62±1.21	1.32
Daily water intake (ml)	190.13±6.46	219.57±7.17	-29.44*
Daily feed consumption (gm)	137.32±16.73	130.03±16.92	7.29
Feed conversion (gm feed/gm gain)	7.25	7.38	-0.13
Viability (%)	100	100	0
Performance Index (%)	33.33±1.81	31.18±1.59	2.15
Social behaviour			
Cashe (% of rabbits)	16.70±4.30	14.10±4.51	2.60
Fight (scratching and biting)	11.92±2.34	8.78±2.63	3.14
Mutual grooming (% of rabbits)	21.15±5.03	23.62±4.94	-2.47
Resting with contact (% of rabbits)	26.20±5.61	40.56±6.18	-14.36
Carcass traits			
Preslaughter weight (gm)	2247.5±26.29	2132.22±32.80	115.28
Hot carcass weight (gm)	1180.83±40.96	1065±42.84	115.83
Carcass weight + (gm)	1409.27v44.63	1296.76±45.71	112.51
Dressing %	62.70±3.81	59.74±4.09	2.96
Liver (gm)	73.33±2.79	70.00±3.16	3.33
Head (gm)	124.5±1.12	122.5±3.10	2.00
Heart (gm)	7.59±0.67	7.21±0.40	0.38
Kidney (gm)	23.02±1.76	28.5±1.00	-5.48*
Spleen (gm)	1.80±0.17	1.48±0.25	0.32
Blood (gm)	80.83±3.07	73.84±9.04	6.99
Gastrointestinal tract (gm)	339.17±15.67	331.67±23.83	7.50
Thyroxine level:			
Thyroxine (T_4) (ng/ml)	26.71±1.10	25.13±1.61	1.58

* Significant at P < 0.05 ** Significant at P) < 0.01

\+ Carcass weight = weights of hot carcass, head , liver, heart and kidney.

group than in the untreated group. These results are supported by Emeash *et al.* (1994), who found that chicks received iodine-treated water showed a marked increase in resting behaviour when compared with the non-iodinated water group.

Rabbits supplemented with 5ppm iodine in drinking water recorded significantly heavier weights for rabbits before slaughter, hot carcass, carcass weight, liver,head and kidney ($P < 0.05$ or $P<0.01$) as compared to the non-iodinated water group (Table 2). On the other hand ,the supplementation of iodine in the water did not affect significantly each of dressing percentage, heart, spleen, and gastrointestinal tract weights. The significant increase of hot carcass weight may be due to the significant effect of preslaughter weight of treated rabbits with iodine. Ayyat (1994) found that carcass weight increased significantly ($P< 0.01$) as affected by copper supplementation in rabbit diets.

Concerning serum blood analysis for thyroxine (T4) concentration, it was observed that the supplementation of water with iodine at 5 ppm significantly increased ($P<0.05$) the thyroxine (T4)level over the untreated water group (Table 2). The significant increase of thyroxine (T4) hormone in serum is due to the supplementation of iodine which considered an essential component for thyroxine synthesis. Habeeb *et al.* (1989) reported that the increase of thyroxine stimulated the protein synthesis.

In conclusion, the low level of iodine (5 ppm) in drinking water was of favourable effect on growth performance and carcass traits, at the same time it improved not only the behaviour of resting and mutual grooming but it also decreased the incidence of aggressive behaviour which will be reflected on growth performance.

2-Effect of water source:

Results in Table (3) show that there were no significant differences between non-iodine-treated tap and ground water used in the present work in their effects on live body weight, daily body weight gain, daily feed intake and feed conversion of growing New Zealand white rabbits from 4-16 weeks of age as well as on preslaughter weight , carcass weight, dressing percentage and weights of liver, head, heart, blood, spleen and gastrointestinal tract. All differences for the aformentioned traits were in favour of rabbits provided with tap water. This may refer to the reverse relationship between salinity and either growth or carcass traits. However, kidney weight was significantly ($P< 0.05$) heavier in rabbits drank ground water than those received tap water . In this respect, Abdel-Samee and El-Masry (1992) reported that there were no significant differences in live body weight, daily body weight gain, feed intake and conversion, preslaughter and carcass weight, dressing percentage and weights of liver, spleen, heart

Table 2. Averages of growth performance, social behaviour frequencies, carcass traits and thyroxine (T_4) level in blood serum of growing NZW rabbits as affected by iodine-treated tap water through nipples.

Items	Iodine-treated tap water through nipples (A)	Untreated tap water through nipples (B)	Difference (A-B)
Growth Performance :			
4-8 weeks of age (1st growing period) :			
No. of animals at 4 weeks	20	20	
Initial body weight (gm)	537.50±33.34	539.50±39.74	-2
Body weight at 8 weeks of age (gm)	1170.00±43.92	1106.00±40.61	64
Daily body gain (gm)	22.59±1.25	20.23±1.41	2.36
Daily water intake (ml)	147.10±10.60	129.31±11.42	17.79
Daily feed consumption (gm)	76.43±8.13	88.14±9.52	-11.71
Feed conversion (gm fed /gm. gain)	3.38	4.36	-0.98
Viability (%)	100	100	0
Performance Index (%)	34.62±1.52	25.37±1.70	9.25**
8-12 weeks of age (2nd growing period) :			
No. of animals at 8 weeks	20	20	
Body weight at 12 weeks of age (gm)	1994.59±45.15	1886.38±43.05	108.21
Daily body gain (gm)	29.45±2.35	27.87±2.11	1.58
Daily water intake (ml)	199.09±11.08	161.24±13.53	37.85*
Daily feed consumption (gm)	105.41±13.28	123.13±15.71	-17.72
Feed conversion (gm feed/gm gain)	3.58	4.42	-0.85
Viability %	95	90	5
Performance Index (%)	55.71±1.81	42.68±1.94	13.03**
12-16 weeks of age (3rd growing period) :			
No. of animals at 12 weeks	19	18	
Body weight at 16 weeks of age (gm)	2695.63±47.75	2416.61±45.85	279.02
Daily body gain (gm)	25.04±1.01	18.94±1.10	6.1**
Daily water intake (ml)	222.18±10.42	190.13v9.46	32.05*
Daily feed consumption (gm)	125.32±17.64	137.32±16.73	-12
Feed conversion (gm feed/gm gain)	5.00	7.25	-2.25
Viability (%)	100	100	0
Performance Index (%)	53.91±1.75	33.33±1.81	20.58**
Social behaviour:			
Cashe (% of rabbits)	10.31±2.18	16.70±4.30	-6.39
Fight (scratching and biting)	6.11±1.60	11.92±2.34	-5.81*
Mutual grooming (% of rabbits)	30.82±5.61	21.15±5.03	9.67
Resting with contact (% of rabbits)	54.56±6.73	36.20±5.61	18.36*
Carcass traits :			
Preslaughter weight (gm)	2540.00±33.66	2247.50±26.29	292.5**
Hot carcass weight (gm)	1305.00±24.30	1180.83±40.96	124.17**
Carcass weight+ (gm)	1603.32±31.51	1409.27±44.63	194.05**
Dressing %	63.12±3.15	62.70±3.81	0.42
Liver (gm)	94.17±2.01	73.33±2.79	20.84**
Head (gm)	166.67±2.11	124.5±112	42.17**
Heart (gm)	8.29±0.40	7.59±0.67	0.70
Kidney (gm)	29.19±2.53	23.02±1.76	6.17*
Spleen (gm)	1.89±0.18	1.80 ±0.17	0.09
Blood (gm)	75.83±4.91	80.83±3.07	-5.00
Gastrointestinal tract (gm)	386.67±20.52	339.17±15.67	47.50
Thyroxinelevel:			
Thyroxine (T_4) (ng/ml)	30.53±1.31	26.71±1.10	3.82*

* Significant at $P < 0.05$ ** Significant at $P) < 0.01$

\+ Carcass weight = weights of hot carcass, head , liver, heart and kidney.

RESULTS AND DISCUSSION

1. Effect of Iodine-treated tap water through nipple:

Results in Table (2) indicate that average daily feed consumption during the three growing periods of study was not significantly affected by the addition of iodine to the water. At the same time the daily water intake during the first growing period was not significantly affected by the addition of iodine to the water, but during the 2^{nd} and 3^{rd} periods the daily water intak significantly increased with the addition of iodine ($P< 0.05$). Rabbits given iodine -treated water showed an improvement in the average daily weight gain and feed conversion as compared to those given the non-Iodinted water. The viability percentages were not affected during the first period (4-8 weeks) and 3rd (12-16 weeks) periods. But during the 2^{nd} (8-12 weeks) period the viability percentage was higher in iodine-treated water group.Rabbits drank iodine-treated water recorded better ($P<0.01$) performance index than those supplied with non-iodine treated water during the three periods of study.

It has been reported that dietary iodine is efficiently absorbed from the gastrointestinal tract (Miller et al., 1975). These results may suggest that the added iodine positively affected the growth and feed utilization not only through the metabolic rate as a reflection increase of the thyroid activity by increasing the secretion of thyroxine as shown in Table (2), but also through the support of intestinal microflora by iodine. The increase in the microflora growth expanded the gastrointestinal capacity and cecum activity as well as it increased the volatile fatty acids production and dry matter digestibility (Pet-Ag, 1987). These volatile fatty acids are the building blocks for the protein,fat and vitamins synthesis which is necessary to allow the increase of weight gain and feed efficiency (Maynard *et al.*, 1979). In other words, the improvement in daily gain and other growth performance traits of growing rabbits supplemented with 5 ppm iodine in water, could be a reflection to the increase of thyroxine hormone, which in turn stimulates the protein synthesis, promotes general growth, maturation and intestinal absorption of carbohydrate as reported by Chastain and Ganjam (1986) and Habeeb *et al.* (1989).The other possibility is a benefit from effects of the established role of iodine as a water sanitizer. In this respect, Emeash *et al.* (1994) found that the chicks that received iodinated water (10 ppm iodine) showed an increase in water consumption and feed conversion than the non iodinated water group. Also, it was noticed that, iodine drinking water at the level of 5 ppm played an important role in growth stimulation as it increased body weight of chicks (El- Agrab, 1991, Emeash *et al.*, 1994).

Concerning the social behaviour, it was observed that the percent of rabbits that exhibited fight (scratching and biting) in the treated group was significantly ($P< 0.05$) lower than in the untreated group. On the other hand resting with contact behaviour increased significantly ($P<0.05$) in the treated

serum. Serum was kept at a refrigerator (-20°C) until analysis of thyroxine (T4). Thyroxine (T4) levels in serum were estimated using radioimmunoassay technique by coated tube kits labled with I^{125} manufactured by Diagnostic Products Corporation,Los Angeles, USA.

Table 1. Chemical analysis of tap and ground water and water parameter

Water parameters	Tap water	Ground water	Guideline value (W.H.O., 1984)
pH	7.2	7.4	6.5-8.5
Total soluble salts (mg/L)	481.0	910.0	1000
Calcium (mg/L)	15.2	23.1	200
Sodium (mg/L)	103.0	315.0	200
Potassium (mg/L)	7.7	35.8	50
Magnesium (mg/L)	3.5	53.6	150
Carbonate (mg/L)	0.0	4.0	200
Nitrate (mg/L)	12.0	23.0	10
Nitrite (mg/L)	0.0	2.0	no guideline value set
Bicarbonate (mg/L)	6.0	136.0	300
Sulfate (mg/L)	203.2	300.8	400
Chloride (mg/L)	75.0	347.0	250

At the last day of the experimental period, 6 rabbits from each group were randomly taken and slaughtered after being fasted for 12 hours. After complete bleeding, each of the pelt, viscera and tail were soon removed and dressing percentage was calculated. Liver, kidney, spleen, heart and head were carefully excised and weighed. Carcass weight and dressing percentage were calculated according to El-Maghawry *et al.* (1993) as follows:

Carcass weight= hot carcass weight + head weight + liver weight +heart weight + kidney weight .

Dressing % = Carcass weight /preslaughter weight x100.

Data obtained were subjected to statistical analysis according to Snedecor and Cochran (1982).

(1984) reported improved growth in egg type pullets and broiler chickens, using low levels of supplemented iodine in the drinking water. Although many reports were published on the use of iodine as a growth stimulant to increase body weight and the use of different types of waterers in chicks (Dhillon *et al.*, 1982; Victor and Jack, 1989, El-Agrab, 1991 and Carpenter *et al.*, 1992), yet no attempts have been made to examine the effect of the different types of waterers and the addition of iodine in the drinking water on the performance and behaviour of rabbits. It was, therefore, of interest to investigate the effect of two types of drinkers, iodine treated water and two sources of water on social behaviour, growth performance and carcass traits in growing New Zealand White rabbits.

MATERIALS AND METHODS

This work was carried out in a private farm at El-Ibrahemia, Sharkia Governorate.

Eighty male New Zealand White rabbits were weaned at 28- days of age, ear taged and divided at random into four groups (20 animals each). Rabbits of each group were housed in separate flat-deck wire cages (5 rabbits per cage). The animals were daily provided by pelleted ration and water ad-libitum at 9.00 a.m. and the residuals of both were measured by weight back technique just prior 9.00 a.m. in the next day. The ingredients of the pelleted ration were 32% barley, 26.5% wheat bran, 30% berseem hay, 8% soybean meal, 2% molasses, 1% limestone, 0.3% sodium chloride, 0.1% Dl-methionine and 0.1% vitamins and minerals. The first group received tap water treated with 5 ppm active iodine (Iodophore Compound, Crown-Chemical Company Limited Ambrehurst Kent) through nipple drinkers.The second group received non- iodine treated tap water through nipple drinkers. The third group received non-iodine treated ground water through nipple drinkers and the fourth group received non-iodine treated tap water from clay trough drinkers. Chemical analysis of tap and ground water are presented in Table (1). The rabbits were weighed at the beginning of the experiment and at weekly intervals thereafter till they reached 16 weeks of age. Each group was observed twice daily for 20 minutes at a randomly determined time from 8 a.m to 4 p.m for 3 days per week for recording the social behaviour frequencies.

Rabbits growth performance was assessed by measuring body weight, weight gain, feed conversion and mortality. The performance index was calculated according to North (1984) as follows: performance index=LBW/FCx100,where LBW is the live body weight expressed in kilograms and FC is the feed conversion efficiency (gm feed/gm gain). Blood samples were taken from the ear vein at four weeks interval from the beginning of the experiments till their ends. Blood was collected in sterile clean centrifuge tubes, and centrifuged for 1/2 hour at 3000 rpm to obtain

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SOCIAL BEHAVIOUR, GROWTH PERFORMANCE AND CARCASS TRAITS IN GROWING NEW ZEALAND WHITE RABBITS AS AFFECTED BY IODINE - TREATED WATER, WATER SOURCE AND WATERING SYSTEM.

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Eighty male New Zealand White rabbits weaned at 4 weeks old were randomly alloted to four equal groups, to study the effect of iodine-treated water, tap and ground water, and nipple and trough drinkers on social behaviour, growth performance, and carcass traits.

Rabbits drank iodine treated tap water scored a significant decrease in fight% and significant increase in resting with contact behaviour% , a significant increase in daily water intake, body weight, daily body weight gain, carcass weight and thyroxine (T4) concentration in blood serum than those drank non- iodine-treated tap water.

There was no significant effect for source of water (tap and ground water) on the social behaviour, live body weight, both feed intake and conversion, carcass weight as well as dressing percentage. Kidney weight and daily water intake increased in rabbits drank the ground water than those drank tap water.

There was a significant decrease in fight behaviour% , and spleen weight, and significant increase in resting with contact behaviour% , body weight at 16 weeks of age, daily body weight gain, daily water consumption, carcass weight and liver weight in rabbits drank from clay trough drinkers than those drank from nipples.

Kev words: Social behaviour, Iodine, water source, drinker type, carcass rabbits

The importance of water and watering equipment on the productive performance of broiler chickens was reported by Andrews (1974 & 1978), Andrews and Harris (1975), and Pesti *et al.* (1985). Vest (1986) reported that producers, who had installed nipple waterers observed improved feed conversion and similar body weights when compared with trough waterers. Several trials have been conducted to study the effect of utilizing natural saline water for different farm animals, Ahmed *et al.* (1985 & 1989) found that natural saline well water contained on the average,9110 ppm total salinity, improved performance of weight gain, efficiency of food utilization and mineral balances in sheep. It is well documented that iodine is an essential nutrient in poultry diets. Kruger *et al.* (1981) and Stanley *et al.*

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