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EFFECTS OF EARLY CHLORTETRACYCLINE ADMINISTRATION AND FARM CLEAN-UP ON GROWTH AND MORTALITY IN BROILER CHICKS

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تأثير إضافة كلور تترا ساكلين مبكرا ونظافة المزرعة على النمو والنفوق في صيصان اللحم

على نسبة النفوق في التجربة الاولى لكن كان التأثير معنويا على نسبة النفوق ، والكسب الوزني ، والكفـــاءة

الحيوي أم لا.

ABSTRACT Three broiler trials were conducted to age of 7-days, 21-days and 42-days, for trials I, 2, and 3, respectively. In trial 1, two treatments were used: 1) the control (c) in which chicks received no preventive medication in the form of chlortetracycline (tetracycline HCL); 2) preventive medication (m-7) in which one day old chicks were given a preventive course (for seven days) of chlortetracycline at 0.5 g/L drinking water. In trial 2, three treatments were used: treatments 1 (c) and 2 (m-7) where similar to those in trial 1; however, chicks in treatment 3 (m-10) were given the preventive course for 10 days. In the third trial, four treatments were used, 1) common broiler house clean-out and chicks were given no medication (c-nm); 2) common broiler house clean-out and one day-old chicks were given a preventive course for 7 days (c-m7); 3)-standard broiler house clean-out and chicks received no medication (s-nm); 4) standard broiler house clean-out and chicks received a preventive course for 7 days. Early administration of chlortetracycline did not significantly affect mortality in trial 1, but significantly affected mortality, body weight gain and feed conversion in trials 2 and 3. House clean out, in trial 4, did significantly affect broiler performance and mortality regardless of early administering of chlortetracycline. It was concluded that administering of chlortetracycline to one day old broiler chicks and using good clean-out and disinfection measures enhanced performance as evaluated by gain and feed conversion and decreased chick mortality.

(KEY WORDS: broilers, performance, mortality, and antibiotics)

INTRODUCTION

Mortality of broilers especially in early life is of great concern to broiler producers. Factors associated with chick mortality include breeder flock, nutrition, diseases, and farm management (McNaughton *et al.,* 1978; Sainsbury, 1984; Zander and Mallison, 1991; Austic and Scott, 1991). Diseases such as Gumboro, salmonellosis, *E. coli,* mucoplasmosis, and aspergillosis can exert their unfavorable effects on the chicks (Sainsbury, 1984). Most disease pathogens can be carried by a large number of insect pests that infest poultry houses. Poultry house clean-out and disinfecting measures coupled with nutritional supplementation and preventive medication can reduce the disease challenge to minimum Level. Sainsbury (1984) listed several antibiotics that have been shown to be beneficial for chick performance when used early in the life of the bird. These antibiotics include chlortetracycline, oxytetracycline, and lincomycin in combination with spectinomycin. Administration of antibiotics separately or in combination with vitamins has been reported to improve livability and growth rate in young broiler chicks to variable degrees (Vernimb *et al.,* 1976; Magonigle *et al.,* 1983; Peterson *et al,* 1991). It is common that producers use antibiotic as a remedial measure later in the chick life rather than a preventive one. Meanwhile, producers do not aim at investing more in the house clean out between broiler patches. Therefore, the objective of the present study was to evaluate the effects of administering the antibiotics as a preventive course on performance and mortality of broilers taking into account the clean-out practices of poultry house.

MATERIALS AND METHODS

Trial 1

In trial 1 treatments were: 1) control (c); 2) preventive medication (m-7) in which day old chicks were given a preventive course of chlortetracycline preparation (6000mg tetracycline HCL/100 gm preparation) at 0.5 g/liter of drinking water (as recommended by the manufacturer). Fifteen hundred commercial broilers were randomly assigned at 1 day of age to the two treatments. Each treatment was replicated three times with 250 chicks per replicate floor pen. The chicks were raised according to the standard procedures (Bell and North, 1990). Chicks were fed a standard starter diet that met nutrient requirements (NRC, 1994). The trial was intended to last for 3 weeks, however, due to uncontrolled circumstances it was conducted for 7 days. Mortality was recorded daily, and feed conversion was adjusted to mortality. Pens were weighed as a group, and feed consumption was measured at 7 days of age.

Trial 2

In trial 2, treatments were: 1) control (c) in which chicks were raised according to the conventional (common) standards; 2) chicks in this treatment received chlortetracycline for 7 days (m-7); 3) chicks in this treatment received the antibiotic for 10 days (m-10). The trial lasted from chick placement to 3 weeks of age. Thirty-six hundred i-day old broilers were, obtained from local distribute, randomly assigned to the three treatments. Each treatment was replicated three times with 400 chicks per replicated floor pen. Each floor pen was equipped with 20 tube-shaped, manually-filled hanging feeders: four bel'-shaped gravity flow drinkeis; a radiant heat brooder; and 10 cm dry wood shavings litter, ('hicks were exposed to 23-hr./day photoperiod. Natural curtain ventilation was available. Chicks received standard commercial starter and grower diets. Mortality was recorded daily, and feed conversion was adjusted for mortality. Pens were weighed as a group, and feed consumption was measured at 3 weeks of age.

Trial 3

In trial 3, treatments were: 1) the control (c-nm) in which rearing houses were cleaned without using proper disinfectant (common or conventional cleaning procedures) and chicks received no medication; 2) common house cleaning and medication for 7 days (c-m7) in which rearing houses were cleaned conventionally and chicks received chlortetracycline for seven days; 3) standard house cleaning and no medication (s-nm) in which rearing houses were cleaned according to standard procedures (Bel! and North, 1990)and birds received no chlortetracycline; 4) standard house cleaning and medication for 7 days (s-m7) in which houses were cleaned as in treatment 3 and birds received chlortetracycline for 7 days. Thirty hundred 1-day old broilers, obtained from a local distributor, were randomly assigned to the fourth treatments. Each treatment was replicated five times with 200 chicks per replicated floor pen. Replicate groups for each treatment occupied a single house and the stocking density was similar for all treatments. Management practices for these chicks were similar to those of trial 2. Mortality was recorded daily, and feed conversion was adjusted for mortality. Pens were weighed as a group and feed consumption was measured at 42 days of age.

Data were analyzed using the General Linear Models (GLM) procedure (SAS, 1998). Separation of means was by Duncan's multiple range test. Percentage mortality values were subjected to arc sine transformation to normalize frequency distribution before statistical analysis. Statistical tests at the 0.05 level were considered significant.

RESULTS

Table 1 shows the average weight gain, feed conversion and percent mortality for chicks in trial 1. Weight gain was significantly different at 7 days of age. Feed conversion ratio was not significantly affected by treatments; however, it is **lower** for chickens received the preventive antibiotic dose. Percentage mortality was lower (0.79 vs. 1-59) for chickens receiving antibiotics and was not significantly affected by medication.

Table 2 shows treatments effect on body weight, feed conversion, and percentage mortality for chickens in trial 2. Body weight was significantly different by eirher 7 or 10 days medication but was lower for the birds in the control treatment. Feed conversion ratio was also significantly improved birds given chlortetraeycline for '•' days and for 10 days. Percentage mortality was significantly higher (3.76 vs. 2.2 and 1.23%) for chickens in the control treatment compared to that for chickens in the treatments 2 and 3.

Table 3 shows the feed conversion and percentage mortality for chicks raised to 42 days of age in trial 3. Feed conversion was significantly improved by standard house cleaning and early antibiotic medication. Preventive antibiotic course significantly lowered percentage mortality in the house cleaned by conventional means. Further significant improvement was also noted when houses were cleaned properly regardless of using or not using preventive medication.

DISCUSSION

Results of these trials are in agreement with previous experiments dealt with the effects of early preventive medication and those dealt with disciplined clean-out of chick houses on feed conversion and survivability of broilers (Vernimb *et al,* 1976; Magonigle *et al.,* 1983). The use of chlortetraeycline in trials 1 and 2 resulted in consistent effects on weight gain, feed conversion and mortality regardless of the duration of chlortetraeycline administration. Interestingly, house clean out procedure resulted in an overall positive effect on these parameters, yet non-significant effects were noticed when chlortetracychne was administered. These data suggest that a disciplined clean out program would be more beneficial than non-disciplined clean out procedure even if preventive medication were implemented. Mortality in the first four or five days of the birds' life is after-effects of the management and health of the breeders or the management hygiene of the hatchery (Peterson *et ah,* 1991; and Zander and Mallison, 1991). Trial 2 indicates that almost one half of the losses in chicks occurred in the first 21 days in life. Therefore, losses in chicks later in life might be due to effects of broiler house, diseases, or management assuming that there is nothing to criticize in the nutrition of the broilers.

Under commercial conditions satisfactory clean up is never accomplished due to the irregularity of the turn-round periods between broiler batches. In addition, many workers are un-aware of the consequences of antibiotic administration later in the chick life. Therefore, satisfactory clean up of the poultry house and the use of a broad-spectrum antibiotic early in the chick life is inevitable.

In conclusion, proper clean out and disinfecting measures significantly improved feed conversion and decreased mortality. In addition, the use of broad-spectrum antibiotics, chlortetracycline in the current study, early in the chick life significantly improved weight gain, feed conversion, and lowered mortality.

REFERANCES

1- Austic, R.E. and ML. Scott, 1991. Nutritional deficiency diseases. Pages 45-71 in: Diseases of Poultry. 9th Edition. B.W. Calnek, H.J Barnes, C.W. Beard, W.M. Reid, and H.W. Yoder, Jr., eds. Iowa State University Press, Ames, IA.

2- Bell, D.D. and M.O. North, 1990. Commercial Chicken Production Manual. 4th ed. Van Nostrand Rineholt, New York, NY.

3- Duncan, D.B., 1955. Multiple rang and Multiple F tests. Biometrics 11:1-42.

4- Magonigle, R.A., C.F. Peterson, and E. Steele, 1983. The effect of subcutaneous injection of oxytetracycline and vitamins in day-old broiler chicks. Poultry Sci. 62:395-396.

5- McNaughton, J.L., J.W. Deaton, and F.N. Reece, 1978. Effect of age of parents and hatching egg weight on broiler chick mortality. Poultry Sci. 57:38-44.

6- National Research Council, 1994. Nutrient Requirements of Poultry. 8th ed. National Academy Press. Washington, DC.

7- Peterson, R.A., G.H. Carpenter and W.T. Jones, 1991. Research Note: Effect of tetracycline hydrochloride and oxytetracycline hydrochloride given via drinking water on early mortality of broiler chicks from twenty-eight-week-old dams. Poultry Sci. 70:1040-1042.

8- Sainsbury, D., 1984. The health of poultry. Pages 111-150 in: Poultry Health and Management. 2nd ed. Granada Publishing Ltd. London, UK.

9- Sainsbury, D., 1984. The poultry house. Pages 53-59 in: Poultry Health and Management. 2"d ed. Granada Publishing Ltd. London, UK.

10- SAS Institute, 1998. SAS Users Guide. SAS Institute, Inc., Cary, NC.

11- Vernimb, G.D., H. Bachmann, and E. Panitz, 1976. Effect of gentamicin on early mortality and later performance of broiler and Leghorn chickens. Avian Dis. 20:706-713.

12- Zander, D.V. and E.T. Mallison, 1991. Principles of disease prevention: Diagnosis and Control. Pages 45-71 in: Diseases of Poultry. 9th edition B.W. Calnek, H.J. Barnes, C.W. Beard, W.M. Reid, and H.W. Yoder, Jr., Eds. Iowa State University Press, Ames, LA

Table 1: Effect of treatment on gain, feed conversion ratio, and mortality of broiler chicks raised to 7 days of age (Trial 1).

Treatment	Gain (g)	Feed conversion (g feed: g gain)	mortality (%)
C (control	95.47[b]	1.25*	L59*
M-7 (medicated)	98.20*	1.15"	0.79*
P>F	(105	(HI	0.12

[a,b] Different letters indicate significant difference between means with columns (P < 0.05)

Table2:Effects of treatments on body weight, feed conversion ratio,and mortality of broiler chicks raised to 21 days of age (Trial 2)

Treatment	Body weight (g)	Feed conversion (g feed: g gain)	Mortality (%)
C (control)	- M K U F "	1.74[a]	3.76"
M-7	548.7"	1.60[b]	2.20[b]
M-10	553.3"	1.61[b]	1.23[b]
P>F	0.0001	0.031	0.004

[a,b] Different letters indicate significant difference between means with columns (P < 0.05)

Table 3: Effects of treatments on feed conversion ratio and mortality of broiler chicks raised to 42 days of age (Trial 3).

Treatment	Feed conversion ratio (g feed: g gain)	Mortality (%)
c-nm	2.27"	8.36"
cm-7	1.98[b]	6.66"
s-nm	1.85[bc]	5.10[c]
sm-7	1.S2[bc]	4.80[c]
p>F	0.0001	0.0001

a, ,c Different letters indicate significant difference between means with columns ($P < 0.05$)