

Animal Health Research Institute-
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**EFFECTS OF ORALLY ADMINISTERED
ENROFLOXACIN ON THE ENTERIC
LACTOBACILLUS FLORA OF THE CHICKENS**
(With 2 Tables)

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(Received at 15/7/1997)

تأثير إعطاء عقار انروفلوكساسين عن طريق الفم
على بكتريا اللكتوباسلس فى أمعاء الدجاج

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لقد أجريت الدراسة على كتاكيت تسمين هبرد عمر ١٠ أيام تم اعطائها عقار الانروفلوكساسين ١٠٪ بجرعة ١٠ ملجرام لكل كيلوجرام من الوزن الحى (وهو ما يعادل ١ سم انروفلوكساسين/٢ لتر ماء) فى ماء الشرب ولمدة خمسة أيام متتاليه. ثم أخذت عينات من محتويات الامعاء بعد الانتهاء من برنامج المعالجه مباشرة ثم أسبوعياً ولمدة خمسة أسابيع بعد ذلك وزرعت تلك العينات على وسط غذائى خاص باللكتوباسلس كما تم متابعة أوزان الطيور بعد المعالجه مباشرة وأسبوعياً بعد ذلك ولمدة خمسة أسابيع. وقد أوضحت الدراسة ان اعطاء عقار الانروفلوكساسين عن طريق ماء الشرب لكتاكيت عمر ١٠ أيام ولمدة خمسة أيام متتاليه له تأثير سلبى معنوى على عدد اللكتوباسلس الطبيعى فى أمعاء الدجاج بعد المعالجه مباشرة كما أوضحت الدراسة عودة عدد اللكتوباسلس فى أمعاء الدجاج تدريجياً بعد ٧ أيام من توقف اعطاء العقار. كما أوضحت الدراسة ان اعطاء الانروفلوكساسين لكتاكيت عمر ١٠ أيام لا يؤثر معنوياً على وزن الطيور.

SUMMARY

The study was conducted on 10 days old, broiler chicks, the chicks were orally administered enrofloxacin 10% in a dose of 10 mg/kg body weight for five successive days. Entric contents samples were taken, diluted and inoculated in ROGOSA media, directly after drug withholding and every week after, for five weeks. Body weight also was recorded weekly. The

results showed that, enrofloxacin 10% in a dose of 10 mg/kg. body weight orally administered for five days, had a temporary inhibitory effects on the enteric lactobacillus of broiler chicken. The lactobacillus of enteric contents returned back to its normal pattern one week after with-holding of the drug. It was concluded that, enrofloxacin had insignificant effects on the body weight in broiler chickens.

Key Words: *Chickens-Enteric Flora-Enrofloxacin.*

INTRODUCTION

Enrofloxacin is a carboxylic acid quinolone derivative, extensively used in veterinary practice for combating many bacterial diseases in most of animals and chickens. It has a wide antibacterial spectrum, against Mycoplasmae, Salmonellae, E. coli, Haemophilus paragallinarum, Pasteurella multocida and Staphylococcal infections in the chickens and turkeys (Bauditz, 1987; Behr, *et al* 1988; Hinz, and Will, 1988; Brander, *et al.*, 1993 and Jordan, *et al* 1993).

It had been estimated that the natural intestinal flora in the chickens, consists of at least 400 different typee of bacteria, totalling some 10^{13} organisms, these microorganisms are vital for the chickens, both in digestive processes and in its resistance to pathogenic organisms (Sainsbury, 1992). In the birds digestive system, a complex relationship exists between efficient nutrient utilization and the pH, this relationship also exists between the pH and nonpathogenic bactria such as lactobacillus spp. which are capable of producing lactic acid and consequently can withstand a high degree of acidity which is usually fatal to other pathogenic bactria (Reddy, 1994). literature describing the effects of enrofloxacin on the enteric lactobacilli of chickens which are important constituents of the bactrial flora appears to be scanty.

So the present study was conducted to investigate the effects of orally administered enrofloxacin on the enteric lactobacillus flora in the broiler chickens.

MATERIALS and METHODS

Chickens and administration:

Sixty Hubbard broiler chicks, 10 days- old weighting 264 g in avarege were used in this study, chicks were fed antibacterial free feed one

week before drug administration. They were divided into two groups; one of them (30 chicks) was used for the tested drug and the other one (control) received no medication. the chicks of the tested group were supplied with water medicated with enrofloxacin 10% in a dose of 10 mg/kg body weight (1 ml. Enrofloxacin 10%/ 2 liter drinking water) daily for five successive days continuously.

Sampling:

Five chicks from each group were sacrificed 0,7,14,21 and 28 days after drug withholding. Enteric mucous contents of the last part of the duodenum and the first part of the ileum of the chicks were drawn, 5 mg from the mucous of duodenum and ileum were taken separately, and dissolved in 10 cc Rogosa broth for 2 hours then inoculated on Rogosa media (Rogosa, and Sharpe, 1959). After overnight inculation anaerobically, the colonies were estimated per gm. enteric mucous with the naked eye (Buratto 1983).

The body weight was recorded every week after the drug withdrawal.

Data was analysed using the student's (t) test according to Snedecor, (1961).

RESULTS

The results showed that orally administered enrofloxacin 10% in a dose of 10 mg/kg body weight (1 ml.Enrofloxacin 10% /2 liter drinking water) for five successive days decrease the lactobacillus colonies /gm mucous in duodenum and ileum directly following the use of the drug. Meanwhile, it returned back to its normal pattern gradually one week after with-holding of the drug. (Table 1).

The body weight was recorded at 7, 14, 21 and 28 day followed drug withholding. (Table 2).

DISCUSSION

The flouroquinlone enrofloxacin is marketed specifically for use in veterinary medicine. It has been shown to be higly effective against Gram negative and Gram positive bacteria including strains resistant to many showed dramatically a decrease in the enteric lactolacillus flora directly

following the use of the drug. Meanwhile, it returned back to its normal pattern gradually one week after withholding of the drug.

The reduction in the numbers of enteric lactobacilli following, the use of enrofloxacin, could be attributed to its inhibitory effects on the activity of the flora.

Similar results has been reported to avoparcin on lactobacillus acidophilus strains in poultry (Dutta, and Devriese, 1981). Moreover, Sainsbury (1992) and Radostits, *et al.* (1994) concluded that birds received feed containing either antibiotics or growth promoting substances may interfere with the establishment of normal enteric microflora. Furthermore similar results has been reported by Sadiq (1996) who concluded that oral administratin of Baytril to adult cattle has a temporary negative influence on fermentation pattern of ruminal flora and fauna.

The temporary inhibitory effects of enrofloxacin on enteric lactobacillus which gradually returned back to its normal pattern 7 days after drug withholding could be attributed to that the chicks acquire the microflora from the immediate surroundings (Sainsbury, 1992).

Although the lactobacilli increase the metabolizable energy avialable for production and growth (Brander *et al.*, 1993). It was expected that enrofloxacin had negative effects on the broiler body weight. The present study confirmed that enrofloxacin 10 mg/kg body weight has insignificant effects on the body weight in broiler chicks, similar observation has been reported by Behr, *et al.*, (1988) who found that enrofloxacin 50 mg/litre for 7 days has no effect on weight gain in broiler chickens.

In conclusion, orally administered enrofloxacin 10 mg/kg. body weight for 5 successive days in broiler chickens has a temporary inhibitory effects on enteric lactolacillus flora.

REFERENCES

- Bauditz, R. (1987):* Results of clinical studies with Baytril in poultry. *Veterinary-Medical -Review*, 2: 130-136.
- Behr, KP; Friederichs, M; Hinz, KH; Luders, H and Siegmann, O. (1988):* Clinical experiences with the drug enrofloxacin in chicken and Turkey flocks. *Tierarztliche-Umschau*, 43: 8, 507-508.

- Brander, G.C.; Pugh, D.M.; Byweter, R.J. and Jenkins, W.L. (1993):* Veterinary applied pharmacology and therapeutics, 5th ED., the bath press, Avon, London., 290, 486-487.
- Buratto, L. (1983):* The natural yeast as a growth factor, proceeding of the meeting called by Doxal, Italia, S.P.A. verone agriculture fair, 19-21.
- Dutta, G.N. and Devriese, L.A. (1981):* Sensitivity and Resistance to growth promoting agents in animal lactobacilli; Journal of applied Bacteriology, 51, 283-288.
- Hinz, KH and will, B. (1988):* Antibacterial in vitro and in vivo efficacy of enrofloxacin against Haemophilus paragallinarum; Berliner und-Munchener-tierarzthiche-wochenschrift. 101: 12, 409-412.
- Jordan, F.T.W.; Horrocks, B.K. and Froyman, R. (1993):* A model For testing the efficacy of enrofloxacin (Baytril) administered to turkey hens in the control of mycoplasma iowae infection in eggs and embryos. Avian dis. 37 (4), 1057-1061.
- Peters, J.E.; Geeroms, R. and Vroonen, C. (1990):* Treatment of colibacteriosis in broiler, rabbits: Field and laboratory trials of enrofloxacin. revue de l'A giculture, 43 (2), 241-255.
- Radostits, O.M.; Blood, D.C. and Gay, C.C. (1994):* Veterinary Medicine. 8th Ed. Bailliere, Tindall.
- Reddy, C.V. (1994):* Probiotic preparations, cultures of organisms or substances which influence the intestinal microbial balance, included in poultry diets. poultry international, July, 37-39.
- Rogosa, M.A. and Sharpe, M.E. (1959):* The approach to the classification of lactobacilli, J. Appl. Bact, 2; 329-340.
- Sadiq, A. (1996):* Effects of orally administered enrofloxacin (BAYTRIL) on the ruminal function of adult cattle. Assiut, vet, med. J. Vol. 35, No. 70, 114-129.
- Sainsbury, D.W.B. (1992):* Protecting against stress; world poultry, Misset Vol. 8 No. 10, 59-81.
- Snedecor, G.W. (1961):* Statistical methods. The Iowa state Univ., Press, Ames, Iowa, U.S.A., 5th ed.
- Wasniewski, A. and Galazka, A. (1991):* Bayer-a preparation for treatment for salmonellosis in poulrtry, Wnoctawiu, Weterynaria, 49, 109-114.

Table 1 : Effects of orally administered enrofloxacin on enteric lactobacillus x 10³ /gm. mucous of duodenum and ileum of chicks. (Means ± S.E)

Sampling time	Control		treated	
	duodenum	ileum	duodenum	ileum
0	27.2 ± 2.99	44.6 ± 11.31	7.2 ± 2.32 *	9.0 ± 6.03 *
7 days	32.2 ± 3.66	44.4 ± 3.71	31.4 ± 2.37	38.4 ± 1.97
14 days	36.8 ± 2.99	47.8 ± 7.91	36.2 ± 4.78	43.8 ± 11.49
21 days	42.0 ± 4.24	45.6 ± 10.44	36.2 ± 47.8	44.2 ± 5.9
28 days	41.2 ± 2.54	45.0 ± 6.03	36.8 ± 2.99	44.4 ± 3.7

* = P < 0.05

Table 2 : Effects of orally administered enrofloxacin on the body weight in the broiler chickens.

Age	Control	treated
7 days	152 ± 40	154 ± 54
14 days	344 ± 100.17	340 ± 40.0
21 days	640 ± 40.0	606 ± 56.0
28 days	928 ± 104.0	924 ± 56
35 days	1300 ± 40.0	1312 ± 64
42 days	1664 ± 176.0	1660 ± 8.0