EVALUATION OF HALOFUGINONE HYDROBROMIDE, BACITRACIN-ZINC AND ROXARSONE IN DIETS OF BROILER CHICKENS

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Story in Brief

Sixteen hundred and eighty day-old broilers were used to study the efficacy of halofuginone, roxarsone and bacitracin combinations in pen reared broilers. The use of bacitracin and roxarsone improved weight gain and feed utilization of broiler chickens in the presence of halofuginone. There were no adverse effects of these drugs on survival under these conditions.

(Key words: Broiler, Gain, Halofuginone, Bacitracin, Roxarsone)

Introduction

Growth and feed efficiency differences between groups of birds used to test drug efficacy are usually small and sometimes inconsistent. Demonstration of antibiotic efficacy can be a very frustrating and time consuming process. Beneficial results attributed to a compound must be demonstrated when fed alone and in combination with other drugs being tested for compatability.

Halofuginone hydrobromide and bacitracin-zinc are antibiotics that have been efficacious as growth promotants in poultry. Roxarsone is an organic arsenical compound that was originally marketed for anticoccidial activity. It is now widely used in poultry diets and is approved by the Food and Drug Administration for growth promotion, improved feed efficiency and for its pigmentation properties. Both roxarsone and bacitracin have been fed in various combinations with other drugs with no reported incompatibilty.

This study was designed to evaluate the influence of halofuginone, bacitracin and roxarsone in specific combinations when fed to broilers reared on floor pens.

Materials and Methods

A total of 1680 day-old broilers of a commercial strain (Arbor Acre X Vantress) were used in this experiment. The chicks were randomly distributed to twenty-eight pens. Sixty birds (30 males and 30 females) were assigned to each pen. Pens measured 7 ft. x 12 ft. thereby providing 1.4 ft^2 per bird and were covered with approximately six inches of rice hull spread over old litter.

The house was continuously lighted throughout the experimental period, with supplemental heat being provided during the first fourteen days.

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From day one, chicks were provided with automatic waterers. Feeder flats were used for the first seven days, then gradually replaced with tube type feeders. Vaccinations for bronchitis, Marek's and Newcastle disease were carried out on the first day.

The National Research Council's specified requirements for broilers of this age were met or exceeded by the formulated diets (Table 1). The drugs halofuginone, bacitracin and roxarsone were added to the diets as specified in the experimental design. Four treatments (Table 2) consisting of seven replicates each were evaluated in this study in a randomized block design.

Feed consumption was monitored throughout the study and all birds that died recorded as mortalities and necropsied to determine the cause of death. At the end the the study, 46-day weights were obtained and feed efficiency and percent mortality calculated.

Results and Discussion

The effects of halofuginone, bacitracin and roxarsone in the diets of mixed male and female broilers are shown in (Table 3). Male chicks fed halofuginone were markedly heavier when either bacitracin, roxarsone or both were included in the diet. The addition of bacitracin to the

Table 1. Experimental diets.

Ingredient	Starter (%)	Finisher (%)	Withdrawal (%)
Ground Corn	54.80	57.95	57.95
Soybean Meal	38.00	35.00	35.00
Alfalfa Meal	3.00	3.00	3.00
Dicalcium Phosphate	2.35	2.35	2.35
Calcium Carbonate	.90	.90	.90
Salt	.40	.40	.40
Vitamin Mix	.30	.30	.30
Trace Mineral Mix	.10	.10	.10
DL-Methionine	.15	0	0
	100.	100.	100.
Calculated Analysis			
ME (Kcal/kg)	2729.68	2762.58	2762.57
Protein (%)	22.13	21.01	21.01
Fat (%)	2.44	2.54	2.54
Fiber (%)	4.70	4.55	4.55
Calcium (%)	1.06	1.05	1.05
Phos. Available (%)	.60	.60	.60
Sodium (%)	.18	.18	.18
Potassium (%)	.99	.95	.95
Lysine (%)	1.27	1.19	1.19
Methionine (%)	.50	.40	.40
Met. + Cystine (%)	.78	.69	.69

Table 2. Experimental Treatments.

Treatment No.	Halofuginone (ppm)	Bacitracin (g/ton)	Roxarsone (ppm)
1	3	0	0
2	3	0	34.1
3	3	50	0
4	3	50	34.1

Table 3. Effect of halofugnone, bacitracin and roxarsone on male and female 46-day body weight.

Treatment No.	Body Weight (g)	
	Male	Female
1	1845^{b}	1571^{b}
2	1931^{a}	1589^{ab}
3	1919^{a}	1641^{a}
4	1911^{a}	1595^{ab}

^{ab}Means in columns with unlike superscripts differ (P<.05).

Table 4. Body weight, feed efficiency and mortality as affected by different combination of halofuginone, bacitracin and roxarsone.

Treatment No.	Body weight (g)	Feed Efficiency	Mortality (%)
1	1708^{c}	2.32^{c}	1.7
2	1760^{ab}	2.30^{bc}	4.1
3	1780^{a}	2.23^{a}	3.1
4	1753^{abc}	2.13^{a}	4.7

^{abc}Means in columns with unlike superscripts differ (P<.05).

diet of halofuginone fed female chicks resulted in a 5% increase ($P<.05$) in weight gain. The use of roxarsone however, although showing a positive trend, did not significantly increase body weight.

When the 46 day weight of all birds were examined together (Table 4) both bacitracin and roxarsone improved ($P<.05$) the performance of broiler chickens fed halofuginone. Feed efficency was improved ($P<.05$) with the addition of bacitracin to the diets but not with roxarsone alone. Examination of the mortality figures recorded, indicted no adverse effects of the different dietary treatments.

Results of this study demonstrate that the use of halofuginone, bacitracin and roxarsone in these combinations has no adverse effect on body weight gains or feed efficiency of broiler chickens feed to 46 days of age. The use of bacitracin and roxarsone appears to improve weight gain and feed utilization in the presence of halofuginone.