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LINCOMYCIN / SULPHAMETHAZINE, LINCOMYCIN / NEOMYCIN AND LINCOMYCIN ALONE FOR GROWTH PROMOTION AND THE PREVENTION OF PNEUMONIA IN SWINE

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ABSTRACT : Thirty Large White x Landrace barrows and 30 similar bred gilts were used in a randomized complete block design experiment determining the efficacy of Lincomycin/Sulphamethazine, Lincomycin/Neomycin and Lincomycin alone at different levels and periods of time on swine growth promotion and prevention of pneumonia.

Six barrows and six gilts were assigned at random to one treatment with three replications. These swine were fed *ad libitum* with a 16.24% protein, for the first period, form the beginning (14.91 kg. liveweight) to 45th feeding day and continued feeding until 90th feeding day with a 13.38% protein as the second period. Swine rations were medicated with none (0-0), Lincomycin (220 ppm - 0), Lincomycin (220 ppm - 44 ppm), Lincomycin / Neomycin Lincomycin (44/100 ppm - 22 ppm) and Lincomycin /Sulphamethazine (44/110 ppm 22/55 ppm) for the first and second period as treatments I, II, III, IV and V, respectively.

After 90th feeding day, 6 swine (3 males and 3 females) from each treatment were randomly slaughtered to determine the lesions of lungs through both gross lesions and microorganism culture caused by pathogenic bacteria and mycoplasma.

Significant differences were obtained in all aspects of production criteria used in this study for the first and second period of growth, except feed conversion ratio from the beginning to 45th feeding day. However, significant differences were not found in the same criteria from 45th to 90th feeding day.

The infectious pneumonia caused by pathogenic bacteria and/or mycoplasma were not found in all treatments of this study. Mortality and morbidity and other defects were not observed in any experimental swine.

It is obvious from this study that, for better productivity amd control of respiratory diseases, medicated swine rations should be practiced.

INTRODUCTION

To elaborate the experiments of Boonlue and Suraluck (1983) and Boonlue *et al.* (1984) on the study concerning the efficacy of drugs as feed additives for growth promotion and control of infectious pneumonia, the experiment on the use of Lincomycin/Sulphamethazine, Lincomycin/Neomycin and Lincomycin alone in different levels added in the

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fattening swine rations was conducted. The examinations of lung lesions determining infectious pneumonia cause by mycoplasma and pathogenic bacteria were done.

The study was conducted at the Department of Animal Husbandry, Faculty of Agriculture, Chiang Mai University. The animals were slaughtered at Meat Processing Division, Chiang Mai Livestock Breeding Station. The identification of pathogenic microoragnism was done at Northern Verterinary Diagnostic Laboratory Center, Lumpang. The duration of the study was from July to December, 1984.

MATERIALS AND METHODS

Thirty barrows and thirty gilts (Large White x Landrace) approximatedly 15 kg liveweight were used in this study. Six barrows and six gilts were assigned at simple random to one treatment with three replication. All pigs were dewormed before the start of the experiment. The pigs were fed *ad libitum* by self-feeder with a 16.24% protein growing ration medicated with none (0), Lincomycin 220 ppm, Lincomycin 220 ppm, Lincomcin plus Neomycin 44/110 ppm and Lincomycin plus Sulphamethazine 44/110 ppm as treatments I (control), II, III, IV and V, respectively. Medicated growing rations were fed for 45 feeding days. The rations, then, were changed to 13.83% protein finishing ration and medicated with none (0), none (0), Lincomycin 44 ppm, Lincomycin 22 ppm and Lincomycin plus Sulphamethazine 22/25 ppm for treatments I to V in another feeding period up to 90 feeding days. The swine rations used in this study are presented in Table 1 and 2. Water was supplied by automatic waterers.

Weighings of animals were done at the begining, 45th and 90th feeding day. Complete records of weights and feed consumption were kept to determine the production performances. Mortality and morbidity of experimental animals were also recorded.

After 90th feeding day, three barrows and three gilts from each treatment were randomly slaughtered to determine gross lesions of lungs and other skeletal defects. Lungs, then, were removed, packed and sent directly to Northern Veterinary Diagnostic Laboratory Center in Lumpang, for the identification of pathogenic microorganisms causing swine pneumonia by microorganism culture technique.

A randomized complete block design was used to analyze production data.

RESULTS AND DISCUSSION

Results of the study are summarized in Table 3. Significant differences in weight at 45th feeding day, weight gain and average daily gain between treatment I and II to V were observed. However, statistical differences were not observed among the treatments II to which agreed to the works of Braude *ed al.* (1953), Eusebio and Puyaoan (1958), Gonzales *et al.* (1962), Gropp and Schulz (1975) and Moser (1977) who reported that the basal rations which fortified with antibiotic (s) gave the better growth rate in swine, Anti-

Table 1. Experiental ration for growing period.

Ingredients/kg	Treatments				
	1	2	3	4	5
Fine rice bran	20	20	20	20	20
Broken rice	30	30	30	30	30
Ground yellow corn	29	29	29	29	29
Soybean oil meal	12	12	12	12	12
Fish meal	7	7	7	7	7
Dicalcium phosphate	1.20	1.00	1.00	1.23	1.20
Danmix	0.25	0.25	0.25	0.25	0.25
Lincomycin	-	0.20	0.20	0.04	0.04
Neomycin	-	-		0.022	-
Sulphamethazine	-	-	-	-	0.06
Salt	0.55	0.55	-	0.53	0.45
Total	100.00	100.00	100.00	100.00	100.00
Chemical composition (proximate analysis) %					
Crude protein	----------			16.24	----------
Crude fiber	----------			4.67	----------
Crude fat	----------			5.48	----------
Crude ash	----------			6.42	----------
Dry matter	----------			68.08	----------
Metabolizyble energy (Kcal/kg), (Calcutated)	----------			3,200	----------
Calcium (calculated)	0.67	0.66	0.66	0.67	0.67
Phosphorus (calculated)	0.95	0.94	0.94	0.95	0.95

biotic (s) can prevent or act against pathogenic bacteria causing diarrhea and other infectious diseases and can also act as growth promotant. Apparently, no significant differences were found among the antibiothics and its combination used in growing period of this study. However, animals in the treatments using the combination of antibiothics gave slightly better growth rate than animals in the treatments using one antibiotic.

Feed consumption and feed conversion ratios are also illustrated in the Table 3. Significant difference between feed consumption for the first 35 days in treatment I and V was

Table 2. Experimental ration for finishing period.

Ingredients/kg	Treatments				
	1	2	3	4	5
Fine rice bran	25	25	25	25	25
Broken rice	29.5	29.5	29.5	29.5	29.5
Ground yellow corn	30	30	30	30	30
Soybean oil meal	8	8	8	8	8
Fish meal	5	5	5	5	5
Dicalcium phosphate	1.8	1.8	1.8	1.8	1.8
Danmix	0.25	0.25	0.25	0.25	0.25
Lincomycin	-	-	0.04	0.20	0.20
Neomycin	-	-	-	-	
Sulphamethazine	-	-			0.09
Salt	0.45	0.45	0.41	0.43	0.40
Tatal	100.00	100.00	100.00	100.00	100.00

Chemical composition (proximate analysis) %		
Crude protein	----------	13.83
rude fiber	----------	4.80
[illegible]	----------	6.08
[illegible]	----------	7.57
Dry matter	----------	8[illegible].46
[illegible]ayble energy (Kcal/kg), (calculated)	----------	3,139
[illegible]ed)	----------	0.7[illegible]
Phosphorus (calculated)	----------	0.75

observed but not in others.

Significant differences were also found on average daily intake between treatment I and IV and treatment I and V but were not observed among other treatments. However, feed conversion ratio of animals in treatments I to V were statistically [illegible]. The results showed that feed consumption and dialy feed intake increased when antibiotic ( ) was added in the rations and gave significantly better rate of growth.

Table 3. Summary of production data 1.

Traits	Treatments					Total/Ave
	1	2	3	4	5	
No. of animals	12	12	12	12	12	12
Initial weight/kg	15.00	14.83	14.93	14.87	14.93	14.91
Weight at 45 feeding days/kg	37.13^{b}	42.63^{a}	43.40^{a}	43.47^{a}	44.07^{a}	42.14
Weight gain---"------/kg	22.13^{b}	27.80^{a}	28.47^{a}	28.60^{a}	29.13^{a}	27.23
Average daily gain--"--/gm	492^{b}	618a	632^{a}	635^{a}	648^{a}	605
Feed consumption---"--/kg	54.27^{b}	60.73^{ab}	60.97^{ab}	61.73^{ab}	67.10^{a}	60.96
Feedconversion ration---"--	2.46	2.18	2.15	2.61	2.30	2.25
Average daily intake--"--/kg	1.20^{b}	1.35^{ab}	1.36^{ab}	1.37^{ab}	1.49^{a}	1.36
Weight at 90 feeding days/kg	71.40^{b}	76.00^{c}	79.03^{ac}	80.20^{a}	78.83^{ac}	77.09
Weight gain----"-----/kg	56.40^{b}	61.17^{cd}	64.10^{a}	65.33^{a}	63.90^{ad}	62.18
Average daily gain---"---/gm	627^{b}	680^{c}	712^{ac}	726^{ac}	710^{ac}	691
Feed consumption---"---/gm	143.60	148.00	155.57	168.37	160.40	155.19
Feed conversion ratio---"--	2.55	2.42	2.43	2.58	2.51	2.50
Average daily intake--"--/kg	1.60	1.65	1.73	1.87	1.78	1.73
ADG, 45-90 feeding days/gm	761	742	792	817	178	777
Weight gain---"---/kg	34.27	33.37	35.36	36.73	34.77	34.95
Feed consumption---"---/kg	89.33	87.27	94.60	106.63	93.90	94.23
Feed conversion ration---"---	2.62	2.62	2.66	2.90	2.68	2.70

[1] Mean in the same row with a common letter are not sifnificantly different at $p<0.01$ (DMRT)

At 90th feeding day, the average weight of animals in treatments I, II, III, IV and V were 71.40, 76.00, 79.03, 80.20 and 78.83 kg with the overall average of 77.09 kg. The weight gain were 56.40 , 61.17, 64.10, 65.33 and 63.90 kg. The average daily gain were 627, 680, 712, 726 and 710. gm, respectively. Signigicant differences in weight at 90th feeding day were found between treatments I and II; I and III, IV, V and II and IV but were not found among treatments II, III and V, and III, IV; and V. Significant differences were also observed in weight gain between treatments I and II, III, IV and V; II and III and IV. However, significant differences were not observed among treatments III, IV and V nor between treatment II and V. The differences in average daily gain among treatments I to V were also found significant between treatments I and II to V, and treatment II and IV. The results confirmed that swine fed with the rations fortified with antibiotic (s) gave significantly better performance traits than those without antibiotic.

The liveweight at 90th feeding day of animals suggested that antibiotic (s) may not be added in swine ration during finishing period or after 40 kg. liveweight. A slightly better growth rate was obtained when the combination of antibiotics was used in the growing priod. The combination of 44 ppm Lincomycin and 110 ppm Neomycin added in growing ration and 22 ppm Lincomycin alone added in finishing ration gave the highest weight compared to the others. Similer results were observed in weight gain and average daily gain. One may conclude from this study that antibiotic or its combination should be added in growing ration of swine for the purpose of disease prevention and growth promotion. However, better results can be expected even when one-fifth dose of antibiotic or its combination is further applied during finishing period. The Lincomycin plus Sulphamethazine gave slightly better results than Lincomycin plus Neomycin or Lincomycin alone in the growing period, but in the finishing period, Lincomycin plus Sulphamethazine did not show any advantages over those of either 44 or 22 ppm of Lincomycin.

No significant differences were observed in feed consumption, feed conversion ration and daily feed intake from the beginning up to 90th feeding day. Similarly, average daily gain, weight gain, feed consumption and feed conversion ratio from 45th to 90th feeding day were not found significantly different. This results conformed to the report of Gropp and Schulz (1975) that the antibiotic (s) gave no increase in weight between 50 and 100 kg liveweight.

For lung examination, 30 hogs from treatments I to V. were randomly selected and slaughtered at Meat Processing Division, Chiang Mai Livestock Breeding Station. Gross lesions of lungs were observed immediatly after swine slaughtered and the results are shown in Table 4. After gross lesions had been done lungs were sent directly to Northen Veterinary Diagnostic Laboratory Center, Lumpang, for identification of microorganisms. The culture of *Haemophilus spp* ., on chocolate agar in atmosphere of carbon dioxide; aerobic microorganisms on blood agar and Mac Conkey agar; and mycoplasma on Yamamoto broth and Yamamoto agar were used. No *Haemophilus spp*., mycoplasma and other pathogenic bacteria were found from the culture.

CONCLUSION

The results from this study indicated that using only Lincomycin or its combination through fattening period gave significantly better growth rate thancontrol and slightly better growth rate than when using in only growing period. Under good management, only 22 ppm of Lincomycin in finishing ration is suggested. Moreover, lung lesions may be found via gross lesion but the incidence may not necessarily caused by pathogenic bacteria or mycoplasma. Its defect might have occured during slaughtering process. For the better growth rate and the prevention and control of respiratory diseases, the 44 ppm Lincomycin plus 110 ppm Neomycin in the growing ration and the 22 ppm Lincomycin in the finishing ration seem to be the best among all treatments.

Table 4. The results of gross lesion of lungs.

Treatments	Normal		Petichial Haemorrhage		Petichial Haemorrhage Ecchymotic Haemorrhang Congestion	
	Number	%	Number	%	Number	%
1	1	3.33	3	10.00	2	6.66
2	3	10.33	1	3.33	2	6.66
3	2	6.66	-	-	4	13.32
4	2	6.66	-	-	4	13.32
5	2	6.66	-	-	4	13.32
Total	10	33.33	4	13.32	15	53.33

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