

EFFECT OF LONG-TERM SALINOMYCIN TREATMENT ON THE PERFORMANCE AND RUMINAL FERMENTATION IN HOLSTEIN STEERS

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Introduction

It has been well known salinomycin(SL), a polyether ionophore produced by a strain of *Streptomyces albus* ATCC 21838, improves the growth and feed conversion ratio(FCR) in beef cattle, primarily due to the modification of microbial fermentation in rumen. While, Kobayashi et al.(1988) reported that some species of rumen microbes might get resistant to SL when the compound was dosed in the rumen for long duration, and also Nakashima et al.(1982) observed that a significant difference in FCR found between SL treated and untreated cattle completely disappeared during the last 15 weeks of the total trial periods of 40 weeks.

The present study aimed to investigate the long-term effect of SL on the FCR and ruminal fermentation in dairy steers.

Materials and Methods

Twelve 4-month-old Holstein steers weighing 169 kg were equally assigned into three treatment

groups, 0 (control), 15 and 30 ppm SL-fed group. These steers were fed on the SL medicated or un-medicated concentrates (TDN 70.5 or 74%) and chopped timothy hay (TDN 52.5%) ad libitum for 410 days. The experimental periods were divided into four stages according to age of month, 4-6 (i), 7-9(ii), 10-13(iii) and 14-17 month-old(iv).

Daily gain(DG), total TDN intake and FCR in each period were calculated with individual body weight and daily feed consumption. Samples of ruminal fluid were collected from all the steers monthly and were analyzed for volatile fatty acid (VFA) concentrations.

Results and Discussion

The average values of DG, TDN intake and FCR in each period are shown in table 1. DGs of steers fed SL 15 or 30 ppm were significantly increased at period ii ($p < 0.01$ or $p < 0.05$) and through the experiment increased by 3 and 4%, respectively, compared with the control steers. TDN intakes of steers fed SL 15 or 30 ppm were decreased by 5 and 4% throughout the experimental

TABLE 1. AVERAGE DAILY GAIN (DG), TDN INTAKE AND FEED CONVERSION RATIO (FCR)

Items	DG (kg)			TDN Intake (kg)			FCR		
	0	15	30	0	15	30	0	15	30
SL Level (ppm)									
i	1.221	1.218	1.291	4.188	4.025	3.917*	3.440	3.325	3.040*
ii	1.136	1.328**	1.233*	6.383	6.144	5.940*	5.629	4.635**	4.822*
Period iii	1.156	1.143	1.227	7.181	6.856	6.635**	6.246	6.019	5.423
iv	1.063	1.019	1.039	8.279	7.829	7.380**	7.801	7.702	7.131
Total	1.141	1.170	1.191	6.574	6.273	6.020**	5.769	5.373	5.063*

*,**Means are significantly different from those in SL-0 ppm group at levels of 5 and 1%, respectively.

periods and FCRs, then, were improved by 7 and 6%, respectively. This improvement of FCR in SL fed steers were due to promoting growth in early stage of fattening and depressing TDN intake throughout the experimental periods. Wakita et al. (1987) suggested that improvement of FCR in cattle fed SL did not result from increasing of DG, but decreasing of feed intake, in contrast to this study, SL tends to promote the growth of steers in early stage of fattening. Merchan et al. (1985) showed that SL improved both rate of DG and FCR in finishing steers but did not describe about

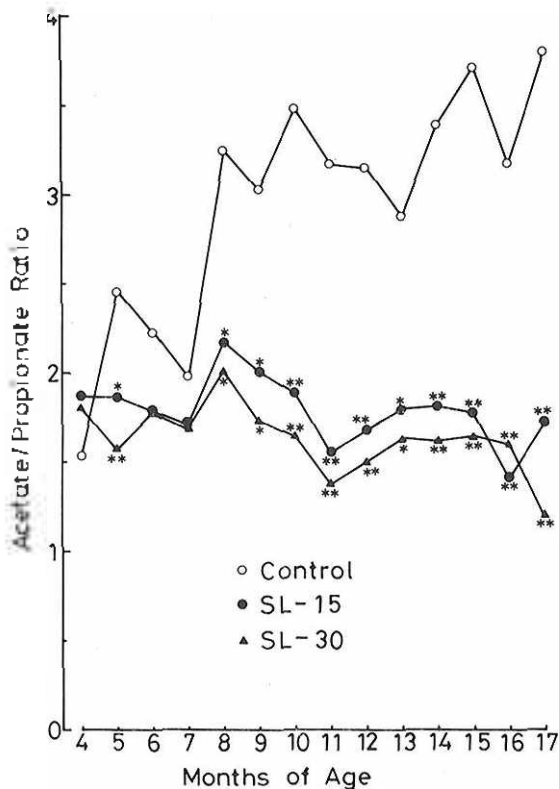


Figure 1. Changes of Ruminal A/P Ratio
* ** Refer to Table 1.

the difference of effects among the growing stages of them.

The changes of acetate per propionate (A/P) ratio in rumen fluid were shown in figure 1. The A/P ratios of steers fed SL 15 or 30 ppm were significantly decreased throughout SL feeding in comparison with control steers. These results were confirmed with those of Nakashima et al.(1982) and Kobayashi et al.(1988), which indicated that SL effect on VFA production pattern well persisted. Further this study proved SL did not influence the carcass quality.

We conclude that long-term SL treatment to steers were almost as those of the short-term SL treatment, but improvement of FCR continued throughout the experimental periods.

(Key Words: Salinomycin, Steers, Performance)

Literature Cited

- M. Wakita, Y. Kobayashi, S. Hoshino, Y. Kitabayashi, M. Hashimura and H. Kudo. 1987. Effects of Salinomycin and Monensin on Feed Conversion of Concentrate and Ruminal Fluid Characteristics in Fattening Holstein Steers. *Jpn. Zootech. Sci.* 58:396-402.
- Merchan, N.R. and L.L. Berger. 1985. Effect of Salinomycin Level on Nutrient Digestibility and Ruminal Characteristics of Sheep and Feedlot Performance of Cattle. *J. Anim. Sci.* 60:1338-1346.
- T. Nakashima, T. Masuno, R. Sakatachi and S. Hoshino. 1982. Effect of Salinomycin on Feed Efficiency, Ruminal and Blood Characteristics of Steers. *Jpn. Zootech. Sci.* 53:541-546.
- Y. Kobayashi, M. Wakita and S. Hoshino. 1988. Persistency of Salinomycin Effect on Ruminal Fermentation in Wethers. *Nutrition Reports International*, 38:987-999.