

Effects of different doses of Buta-ER in feed on broilers' growth performance, apparent digestibility of nutrients, slaughter performance, intestinal morphology and microbial flora.

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Introduction

Without odour emission, moisture absorption, deliquescence or volatilization, Buta-ER™ overcomes the disadvantages of sodium butyrate and becomes increasingly attractive for replacing sodium butyrate as an alternative to AGPs in animal production. Hence comparative rearing trials between gradient doses of Calcium Butyrate, AGPs and Sodium Butyrate were performed.

1. Rearing Trial Subjects and Methods

2400 Chinese yellow feathered broilers were randomly assigned to 8 groups for rearing trials as indicated in table 1:

Table 1: Grouping and Rearing Trials (ppm,%)

	Group 1 Control Group	Group 2 AGPs Group	Group 3 Sodium Butyrate	Group 4 Buty-ER Group	Group 5 Buty-ER Group	Group 6 Buty-ER Group	Group 7 Buty-ER Group	Group 8 Buty-ER Group
Basal Diet	Basal Diet	Basal Diet	Basal Diet	Basal Diet	Basal Diet	Basal Diet	Basal Diet	Basal Diet
Colistin Sulphate	—	20	—	—	—	—	—	—
Virginiamycin	—	20	—	—	—	—	—	—
Sodium Butyrate	—	—	0.3	—	—	—	—	—
Calcium Butyrate	—	—	—	0.1	0.2	0.3	0.4	0.5

2. Result

As indicated in table 2, Calcium Butyrate, while having no significant impact on the feed intake, promotes the growth of the yellow feathered broilers and decreases the FCR.

Table 2: Effects of Calcium Butyrate on the growth performance of the yellow feathered broilers and the feed utilization

	Group 1 Control Group	Group 2 AGPs Group	Group 3 Sodium Butyrate	Group 4 Buty-ER Group	Group 5 Buty-ER Group	Group 6 Buty-ER Group	Group 7 Buty-ER Group	Group 8 Buty-ER Group
Initial Weight(g)	36.36±0.73	36.07±1.08	37.02±1.48	36.85±1.84	36.41±2.18	36.52±2.56	36.54±2.92	36.68±3.30
Final Weight (g)	1778.86±35.58	1806.57±54.20	1825.02±73.00	1834.35±91.72	1832.91±89.97	1861.02±146.0	1827.54±130.5	1836.18±165.2
Daily Weight Gain (g)	34.55±0.70a	35.41±1.06b	35.76±1.43b	35.95±1.80b	35.93±2.16b	36.49±2.05c	35.82±2.16b	35.99±2.87b
Daily Feed Intake (g)	80.50±1.60	80.03±2.40	79.39±4.03	80.53±3.40	81.56±4.03	79.91±3.18	80.60±5.59	80.26±4.89
FCR	2.33±0.05a	2.26±0.07b	2.22±0.09b	2.24±0.14b	2.27±0.20b	2.19±0.11c	2.25±0.18b	2.23±0.20b

Table 3 indicates: compared with Group 1 (Control Group), the number of *lactobacilli* has been increased and the number of *Escherichia coli* has been reduced significantly ($p<0.05$), and the quantity ratio appears unanimous too ($p<0.05$). As shown by the quantity distribution, the obvious dosage effect is demonstrated with the increase usage of calcium butyrate.

Table 3: Effects of different doses of Buta-ER in feed on broilers' microbial flora (lg(CFU/g))

	Group 1 Control Group	Group 2 AGPs Group	Group 3 Sodium Butyrate	Group 4 Buty-ER Group	Group 5 Buty-ER Group	Group 6 Buty-ER Group	Group 7 Buty-ER Group	Group 8 Buty-ER Group
Lactobacilli	7.13±0.14a	7.37±0.22b	7.44±0.30b	7.40±0.37b	7.46±0.45b	7.50±0.53c	7.56±0.61c	7.63±0.68c
E. Coli.	8.01±0.16a	7.59±0.23b	7.68±0.31c	7.39±0.37d	7.50±0.45b	7.20±0.50d	7.05±0.56e	6.83±0.61f
Lactobacilli: E. Coli.	0.89±0.02a	0.97±0.05b	0.97±0.04b	1.00±0.03b	0.99±0.06b	1.04±0.09c	1.08±0.07c	1.11±0.10c

Table 4 indicates: compared with Group 1, villus lengths of the duodenum, jejunum and ileum of Groups 2-8 are increased ($P<0.05$); the V/C values in Groups 2-8 are increased as well ($P<0.05$); but the crypt depths of these groups are showing different results.

Table 4: Effects of different doses of Buta-ER in feed on yellow feathered broilers' intestinal mucosa morphology

	Duodenum			Jejunum			Ileum		
	Villus Lengths (μm)	Crypt Depths (μm)	V/C	Villus Lengths (μm)	Crypt Depths (μm)	V/C	Villus Lengths (μm)	Crypt Depths (μm)	V/C
Group 1	1088.11±21.76a	135.01±2.70a	8.06±0.16a	1030.40±20.61a	132.01±2.64a	7.81±0.16a	779.33±15.59a	122.58±2.45a	6.36±0.13a
Group 2	1341.18±40.24b	151.31±4.54b	8.86±0.27b	1537.77±46.13b	151.23±4.54b	10.17±0.31b	849.08±25.47b	130.45±3.91b	6.51±0.20b
Group 3	1174.01±46.96c	133.11±2.32a	8.82±0.35c	1434.94±57.40c	139.62±5.58c	10.28±0.41c	912.4±36.50c	128.48±5.14c	7.10±0.28c
Group 4	1273.21±63.66d	136.33±6.82a	9.34±0.47d	1564.98±78.25d	138.66±6.93c	11.29±0.56d	930.01±46.50d	129.64±6.48c	7.17±0.36c
Group 5	1330.53±53.23e	149.08±5.96b	8.92±0.36e	1509.57±60.38e	125.47±5.02d	12.03±0.48e	1030.71±41.23e	127.26±5.09c	8.10±0.32d
Group 6	1387.06±27.74f	146.53±2.93b	9.47±0.19f	1575.05±31.50f	121.74±2.43d	12.94±0.26f	1072.25±21.44f	123.62±2.47a	8.67±0.17e
Group 7	1339.32±66.97e	143.60±7.18b	9.33±0.47e	1523.55±76.18e	119.31±5.97e	12.77±0.64e	1030.80±51.54e	121.15±6.06a	8.51±0.43e

3. Conclusion

Buta-ER™ (dietary Calcium Butyrate) can promote intestinal villus development of broilers, and can improve their intestinal microflora, daily weight gains and the feed utilization. Therefore, Buty-ER improves the production performance of broilers by replacing AGPs and/or sodium butyrate of the same dosage strength.