Bio-Mos® supplementation of milk replacer: calf growth and health responses

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Objective

To investigate the effect of the prebiotic Bio-Mos® (Alltech Inc.) on diarrhea prevention, health status, weight gain, starter feed consumption and blood chemistry values in calves.

Materials & Methods

Animals and experimental design

- Location: Dobrosev a.s. Farm, Dobronin, Czech Republic
- 19 Holstein calves (5 d of age) randomly assigned to 2 groups:
  - Control (4 male, 5 female)
  - Bio-Mos® (6 male, 4 female)
- At 14 d of age, pelleted calf starter (*ad libitum*) was introduced.
- Duration of feeding trial = 56 d (August and September 2006)

Treatments

- Control – milk replacer (2 L twice daily)
- Bio-Mos® – milk replacer (2 L twice daily) + Bio-Mos® (5 g/hd/d)

Measurements

- Health status, diarrhea occurrence, weight gain, starter feed consumption
- Selected blood chemistry parameters before trial start (3 d of age), and on d 14, 28, and 56

Data analysis

- Means compared using non-paired t-test (P<0.05).

Results

Growth rate (Table 1)

- In the first half of the trial (d 1–28), average daily gain (ADG) was similar (P>0.05) between the treatments.
- In the second half of the trial (d 29–56), ADG was higher (P<0.05) in calves fed Bio-Mos® compared with the control (0.68 kg and 0.84 kg, respectively).
- For the entire trial period (d 1–56), ADG differed (P<0.05) between treatments (0.55 kg and 0.47 kg, for Bio-Mos® and control, respectively.

Table 1. Effect of Bio-Mos® on calf performance.

	Control	Bio-Mos®
ADG, kg/d		
Days 1-28	0.24	0.26
Days 29-56	0.68	0.84*
Days 1-56	0.47	0.55*
Feed consumption		
Days 10-28	0.34	0.33
Days 29-56	1.11	1.28*

*Means differ, P<0.05

Feed consumption (Table 1)

- Bio-Mos® supplementation increased (P<0.05) starter feed consumption by calves in the second half of the trial.
- From d 28 to d 56, average daily starter feed consumption was 1.28 kg/calf/d and 1.11 kg/calf/d for calves fed Bio-Mos® and control treatments, respectively.
- Total starter feed consumption was 35.88 kg/calf and 34.09 kg/calf for Bio-Mos® or control treatments, respectively.

Health (Table 2)

- No adverse effects of Bio-Mos® on calf health were observed.
- There was a low incidence of diarrhea, most likely due to the diarrhea control program implemented on the farm.

Table 2. Effect of Bio-Mos® on the incidence of diarrhea.

Treatment	Number of calves by score				
	+	++	+++	++++	Total
Control	22	12	0	0	34
Bio-Mos®	19	10	0	0	29

Blood chemistry and Ig content (Table 3)

- Calves fed Bio-Mos® had higher (P<0.05) serum immunoglobulin levels on d 56.
- Calves fed Bio-Mos® had higher (P<0.05) serum levels of magnesium and iron on d 14, 28 and 56.

Table 3. Effect of Bio-Mos® on serum chemistry parameters.

Variable	Control				Bio-Mos®			
	3 d of age	d 14	d 28	d 56	3 d of age	d 14	d 28	d 56
TP, g/L	52.57	61.66	63.1	63.62	52.72	62.56	63.93	64.44
Alb, g/L	33.77	40.09	38.5	40.48	33.96	40.43	39.93	42.13
Ig, g/L	11.8	10.86	14.46	15.76	12.06	10.85	15.09	16.93*
U mmol/L	3.07	3.31	3.47	3.8	3.03	3.44	3.47	3.94
AST, ukat/L	0.71	0.75	0.87	1.12	0.71	0.74	0.95	1.12
CK, ukat/L	2.27	2.5	2.41	2.31	2.44	2.58	2.25	2.07
Na, mmol/L	146.11	211.56	145	146.11	143.7	145.2	145.4	144.6
K, mmol/L	4.35	4.32	4.28	4.27	4.33	4.29	4.27	4.23
Ca, mmol/L	2.35	2.38	2.39	2.38	2.37	2.37	2.37	2.34
P, mmol/L	2.4	2.4	2.35	2.33	2.39	2.36	2.34	2.32
Mg, mmol/L	0.68	0.68	0.7	0.74	0.66	0.72*	0.77*	0.79*
Zn, mmol/L	12.77	11.61	13.08	13.45	12.41	12.1	13.37	13.77
Fe, mmol/L	15.24	14.71	17.12	21.17	13.78	18.04*	21.5*	26.66*

* P<0.05 for values on same row and corresponding day

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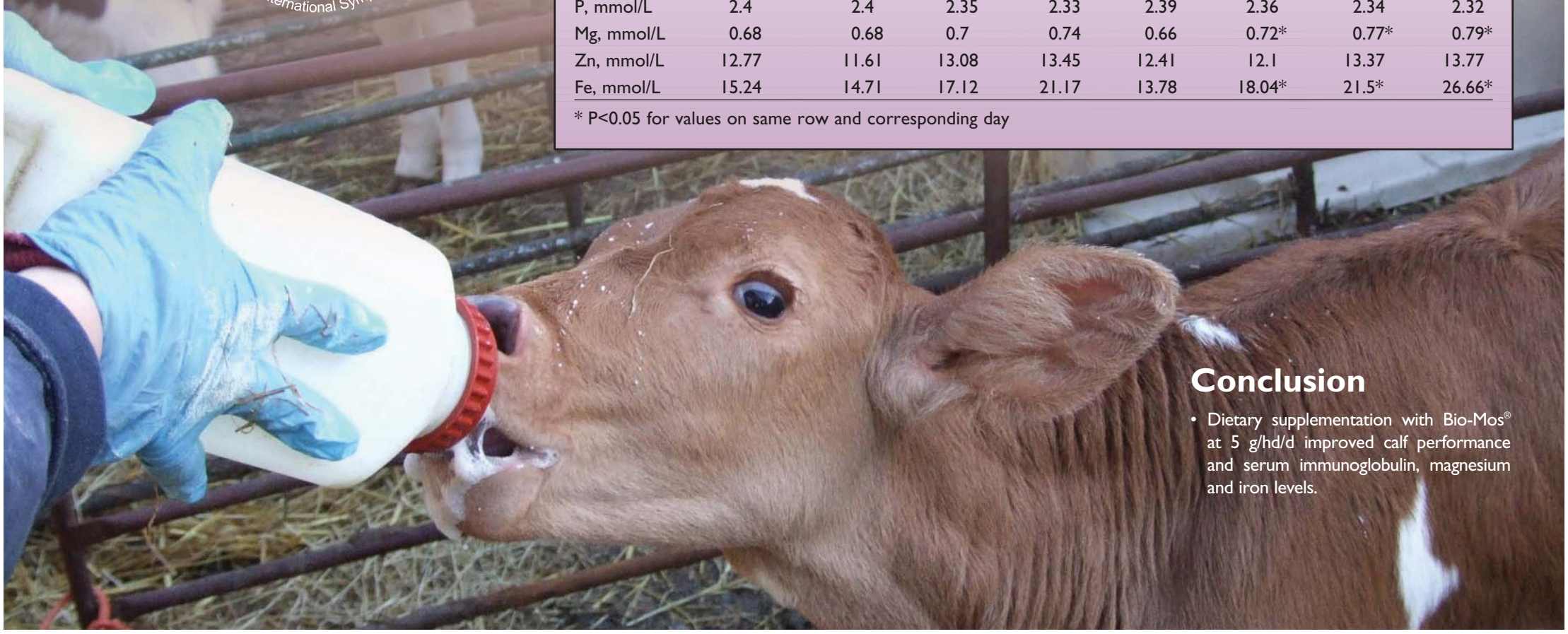

Conclusion

- Dietary supplementation with Bio-Mos® at 5 g/hd/d improved calf performance and serum immunoglobulin, magnesium and iron levels.