

Table 5 Effects of different manganese sources on fecal bacterial of weaning calves at phylum level.

Item	Group	Duration of treatment (days)					SEM	P-value		
		-1	1	3	7	14		D	T	D×T
<i>Bacteroidota</i>	CON	42.87	47.19	46.87	41.26	48.45	0.08	0.17	0.83	0.16
	LGM	45.10	46.13	42.79	41.37	45.86				
	MnSO ₄	40.43	37.62	41.25	48.82	52.74				
<i>Firmicutes</i>	CON	49.71	47.16 ^A	48.17	56.25 ^A	49.28 ^A	8.13	0.15	< 0.01	0.20
	LGM	43.87	44.99 ^A	45.72	41.44 ^B	46.04 ^{AB}				
	MnSO ₄	43.13	32.69 ^B	38.87	46.58 ^B	40.03 ^B				
<i>Proteobacteria</i>	CON	1.25 ^B	1.64	1.51	1.00	0.86 ^B	3.18	0.02	< 0.01	< 0.01
	LGM	2.49 ^B	3.21	3.69	3.62	3.72 ^A				
	MnSO ₄	5.37 ^{Aa}	6.60 ^a	4.82 ^a	0.96 ^b	0.72 ^{Bb}				
<i>Spirochaetota</i>	CON	0.02 ^B	0.10 ^B	0.07 ^B	0.07	0.06	2.50	0.11	< 0.01	< 0.01
	LGM	6.34 ^A	1.94 ^A	6.39 ^A	2.36	2.17				
	MnSO ₄	1.04 ^B	1.32 ^A	0.90 ^B	2.08	3.15				
<i>Actinobacteriota</i>	CON	1.46	1.96	1.53	1.00	1.22	1.59	0.54	0.48	0.77
	LGM	1.88	1.69	0.87	0.86	1.69				
	MnSO ₄	1.52	1.45	2.64	0.99	2.93				
<i>Verrucomicrobiota</i>	CON	0.01 ^B	0.02	0.01	0.01	0.01	0.07	0.37	< 0.01	0.61
	LGM	0.11 ^A	0.13	0.05	0.02	0.09				
	MnSO ₄	0.04 ^B	0.01	0.01	0.02	0.07				

Values in the same row (a, b) or in the same column (A, B) with different letters are significantly different ($P < 0.05$).

LGM, in the form of chelates (lysine Mn: glutamic acid Mn = 1:1). MnSO₄, in the form of sulfate Mn. SEM, standard error of means. D, effect of day. T, effect of group. D × T, interaction between day and group.