

Effect of an Oral Dose of *M. elsdenii* NCIMB 41125 on Lower Digestive Tract, Bacteria Count and Rumen Fermentation in Holstein Calves

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Abstract : Twenty four new born male Holstein calves were divided into two treatments groups and used to evaluate the effects of *M. elsdenii* NCIMB 41125. The first groups were dosed with 50 ml containing 108 CFU/mL of *M. elsdenii* NCIMB 41125 (Me) and the control calves were not dosed. Within each of the two treatments groups, calves were divided into three treatment groups (Not dosed: 7 d, 14 d and 21 d vs dosed Me 7 d, Me14 and Me21 d (treatments), each groups contained 4 calves within which two calves were euthanized at 24 h and two calves at 72 h. Calves entered the trial until euthanize at whether 24 or 72 H after dosing time. After receiving colostrum for 3 consecutive days after birth, calves were fed whole milk and had free access to a commercial calf starter pellet and fresh water. Fecal grab samples were taken from each calf in duplicate +24 h or +72 h relative to dosing. Immediately after euthanizing, the digestive tract was harvested, and duplicate rumen and colon digesta samples collected for VFA's determination and DNA extraction for bacteria count using 16s RNA PCR probe technique. Independent two t-test was performed to compare mean volatile fatty acids. Mixed-effects linear regressions were performed to establish relationships between: 1) *M. elsdenii* and Me, and between VFA's and Me using SAS (2009). *M. elsdenii* NCIMB 41125 was detected in the faeces, colon and rumen of dosed calves at both +24H and +72H and ranged from 1.6×10^6 to 4.9×10^9 cfu/ml, indicating its potential to colonize in the digestive tract of calves. There was a strong positive relationship ($R^2=0.96$; $P < 0.0001$) between *M. elsdenii* NCIMB 41125 and *M. elsdenii* population (cfu/ml) in the rumen, suggesting that the increase in *M. elsdenii* was due to increased *M. elsdenii* NCIMB 41125. An increase in butyrate was observed from +24 h to +72 h when calves were dosed on both d 7 and 14. Results showed that Me presented a positive relationship with butyrate ($P < 0.001$, $R^2 = 0.43$) and a concomitant negative relationship with acetate ($P = 0.017$, $R^2 = -0.33$). These results suggest that dosing pre-weaned dairy calves with *M. elsdenii* NCIMB 41125 has the potential to alter ruminal VFA production through increasing proportions of butyrate at the expense of propionate.

Keywords : calves, megasphaera elsdenii, rumen fermentation, bacteria

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