Effect of manganese trace mineral source on 48-h in vitro fermentation

Source and level of trace mineral supplementation can have a significant impact on dairy performance

Dairy cows need at least 15 different minerals for good health and productivity. Traditionally, the focus of nutritionists has been to avoid under-supply to avoid deficiencies. More recently, it has become apparent that the level of supplementation as well as the source of trace mineral used can have a significant impact on rumen fermentation, with a potential impact on feed efficiency, lactational performance and health and fertility of dairy cows.

The impact of trace mineral source on NDF digestibility

It has been suggested that 1 point increase in NDF digestibility leads to an increase of 0.17 kg dry matter intake and 0.25 kg of 4% fat corrected milk[1]. A recent meta-analysis which included 12 different peer reviewed studies showed an overall 1.7% points improvement in NDF digestibility in vivo when feeding Selko IntelliBond trace minerals versus sulphates[2]. The amount of data evaluating the effects of supplemental mineral sources on rumen fermentation characteristics is however limited.

Evaluating the effect of manganese source on rumen fermentation characteristics

The effect of different manganese trace mineral sources on apparent organic matter disappearance (aOMD and apparent microbial biomass production (aMBP) was tested[3,4].

Material and methods

Selko IntelliBond M and Selko Optimin Mn were compared to Mn oxide and Mn sulphate. Rumen fluid samples were added to fermentation vessels containing a mixture of 80% KSU buffer and 20% rumen fluid and bags containing a sample of dairy TMR as a substrate for fermentation. These vessels were subsequently incubated for 48-h at 39.5°C. PROC MIXED (SAS institute Inc, Cary, NC) was used for data analysis. A p-value ≤ 0.05 was considered significant. All 4 mineral sources were compared to a control with no trace mineral source included.

Results

Mn oxide and Mn sulphate reduced aOMD relative to the control ($P<0.001$), whereas Selko IntelliBond M and Selko Optimin Mn were similar to the control (see Figure 1). Selko IntelliBond M and Selko Optimin Mn had higher apparent microbial biomass production (aMBP) than the control, Mn sulphate and Mn oxide treatments ($P<0.01$, see Figure 2).

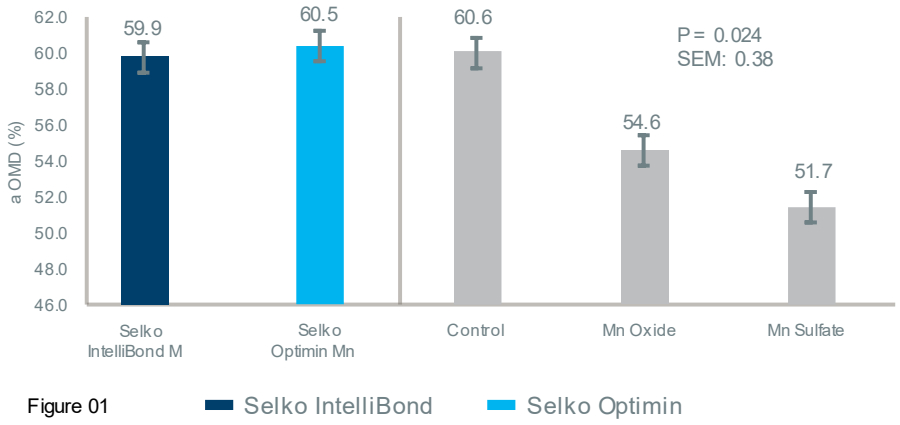

Figure 1: Apparent Organic Matter Disappearance of Selko IntelliBond M and Selko Optimin Mn vs other manganese trace mineral sources.

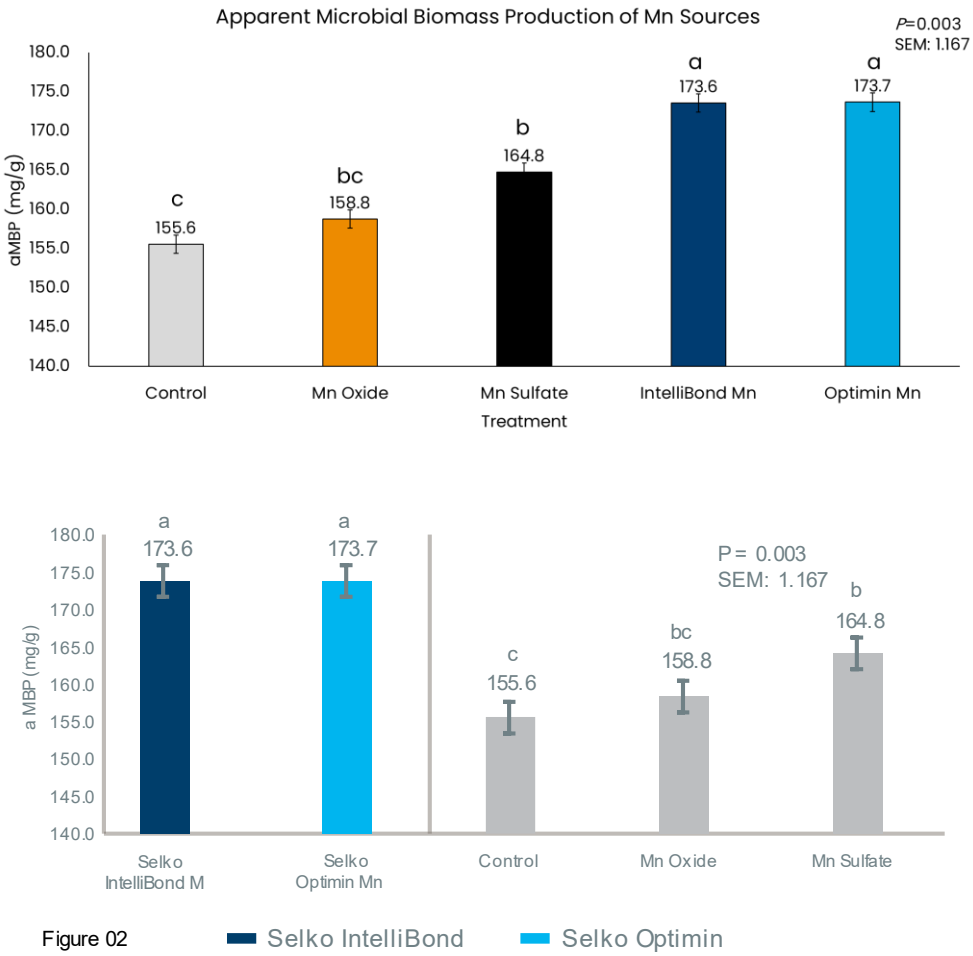

Figure 2: Apparent Microbial Biomass Production of Selko IntelliBond M and Selko Optimin Mn vs other manganese trace mineral sources.

Conclusion

Compared to the control without a manganese source, apparent Microbial Biomass Production (aMBP) was increased by Selko IntelliBond M and Selko Optimin Mn, suggesting a positive impact of manganese supplementation on rumen fermentation of dairy cattle. Compared to control, Selko IntelliBond M and Selko Optimin Mn did however not increase apparent Organic atter Dissapearance (aOMD). Compared to Mn sulphate and Mn oxide, both for Selko Optimin Mn and Selko IntelliBond M, aMBP and a OMD were increased, suggesting that the source of manganese supplementation for dairy cattle can have a significant impact on rumen fermentation.

References

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