Effects of glycerolesters of short- and medium chain fatty acids on immune, health and growth variables in veal calves

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Objectives

In current production systems, Holstein bull calves experience many different stressors and excessive pathogen exposure, necessitating antimicrobial use for welfare and production reasons. The aim of this randomized clinical trial was to explore the effects of esterified fatty acids used as feed supplement on health, production and immune variables in veal calves.

Materials & methods

One hundred sixty eight calves were randomly assigned to 6 treatment groups; short chain fatty acid-based glycerol-mono- and tributyrate, medium chain fatty acid-based glycerol-monocaprylate/monocaprinate in low and high dose, glycerol-monolaurate in low and high dose and a control group (CON).
Average daily gain, bodyweight at 14 weeks on feed and carcass weight were determined. Health monitoring consisted of clinical signs and repeated thoracic ultrasonography. After 4, 8 and 12 weeks on feed, the function of neutrophils, monocytes and peripheral blood mononuclear cells (PBMC) was evaluated *ex vivo* by measuring reactive oxygen species (ROS) production by neutrophils and monocytes and by proliferation and cytokine release by PBMC.

Results

No significant effects on health and growth variables could be evidenced. Supplementation with glycerol-esters resulted in immune modulation, depending on the ester, dose and duration of treatment. Main findings were increased secretion of the cytokines IL-17A, IL-6 and chemokine IL-8 by PBMCs after 4 weeks of supplementation in the high monocaprylate/monocaprinate, low monolaurate and monobutyrate calves, combined with decreased ROS production by neutrophils and monocytes.

Conclusion

High dosed monocaprylate/monocaprinate and low dosed monolaurate have the potential to promote an early pro-inflammatory immune response with limited tissue damage by ROS, which might be beneficial in the clearance of pathogens in young calves subjected to periods of stress and high pathogen exposure.