

Effects of glycerol-esters of saturated short- and medium chain fatty acids on immune, health and growth variables in male dairy calves

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Introduction Holstein bull calves (2-4 weeks of age) experience a lot of different stressors before they arrive at the veal farms. Animals from many different origins are commingled and transported, leading to a high pathogen burden, a high disease incidence and the need to use antimicrobials for welfare and production reasons. The aim of this randomized clinical trial is exploring the effects of glycerol-esters as feed supplement on health, production and immune variables in male dairy calves.

Methods One hundred sixty eight male calves were randomly assigned to 6 treatment groups [glycerol-monobutyryl (GMB, n=21); glycerol-tributyryl (GTB, n=21); glycerol-monocaprylin/monocaprin in a low (GMCL, n=28) and high dose (GMCH, n=21); glycerol-monolaurin in a low (GMLL, n=21) and high dose (GMLH, n=28)] and a control group (CON, n=28). Average daily gain (ADG), body weight at 14 weeks on feed and carcass weight were determined. Health monitoring consisted of clinical signs and thoracic ultrasonography. After 4, 8 and 12 weeks of supplementation, immune cell function was evaluated *ex vivo* by measuring reactive oxygen species (ROS) production in neutrophils and monocytes and by proliferation and cytokine release of PBMCs.

Results No significant effects on growth and animal health were seen. However, glycerol-esters exert their influence on the function of neutrophils, monocytes and PBMCs. Significant effects on ROS and cytokine production were visible in GMB, GTB, GMCH and GMLL groups compared to the control group. PBMCs showed significant increased proliferation in the GTB and the GMLL groups. Also, a dose dependent effect could be observed on ROS and cytokine production of GMC and GML. Another dose dependent effect was found with GMB/GTB on PBMC proliferation.

Conclusions By supplementing calves with glycerol-esters it is possible to modulate immune functions of neutrophils, monocytes and PBMCs in a dose dependent manner.