

TRIAL REPORT

Improved health status and immune response in neonatal calves in response to hydrolysed yeast

INTRODUCTION

Neonatal calves are highly susceptible to diseases because their immune system is immature. Hydrolyzed yeast (HY) contains cell wall components and high amounts of soluble, bioactive particles. HY exerts its effect in the digestive tract by preventing pathogenic bacteria from binding to intestinal epithelial cells and by modulating the immune system. The current trial investigated whether hydrolyzed yeast could influence the immune response of neonatal calves.

MATERIALS AND METHOD

Holstein calves (n=12) housed in individual pens were fed calf starter and mixed grass hay from the 1st and 4th weeks of age, respectively, supplemented with whole milk. Calf starter was fed either with or without supplementation of hydrolysed yeast (HY) at 0.2% from the 1st week after birth. Calves were challenged with 1-ml porcine Hog cholera and *Erysipelothrix insidiossa* live vaccine by intramuscular injection at 3 weeks old (0 days post- vaccine challenge (DPVC): days post-microbial infection). Health and faecal scores were monitored and blood samples were collected from jugular veins for analysis.

RESULTS

Calves fed the HY starter feed showed significantly better ($P < 0.05$) faecal and health scores at three weeks of age compared to the control. Vaccine challenge increased ($P < 0.05$) concentration of total serum IgG at 19 DPVC. At 14 and 19 DPVC, total IgG level of the control group was significantly ($P < 0.05$) higher than HY group. There was a significant difference ($P < 0.05$) in antigen specific IgA between calves fed different starter feeds (figures 1 and 2) while vaccine challenge did not influence antigen specific IgG.

Figure 1: Change in relative concentrations of bacteria-specific antibodies in serum

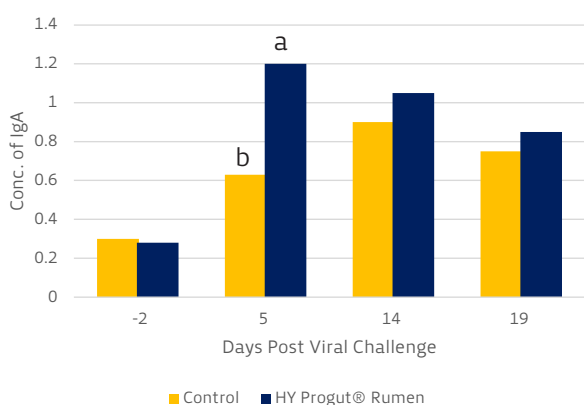
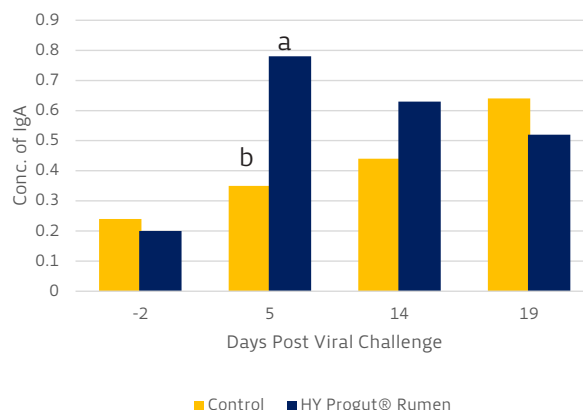


Figure 2: Change in relative concentrations of virus-specific antibodies in serum



a,b $P < 0.05$

Hydrolyzed yeast influenced neutrophil and platelet levels after microbial infection (figure 3). Calves in the control group showed a reduction in neutrophil % and a reduction in platelet count at 5 DPVC, compared to those at -2 DPVC, whereas the blood cells of calves receiving the HY did not show changes after microbial infection. Low level of neutrophils and decreased platelets are typically connected to bacterial and virus infections. The results suggest that hydrolyzed yeast improved the prognosis after microbial infection.

Figure 3a: Effect of HY on neutrophil (%) after vaccine challenge

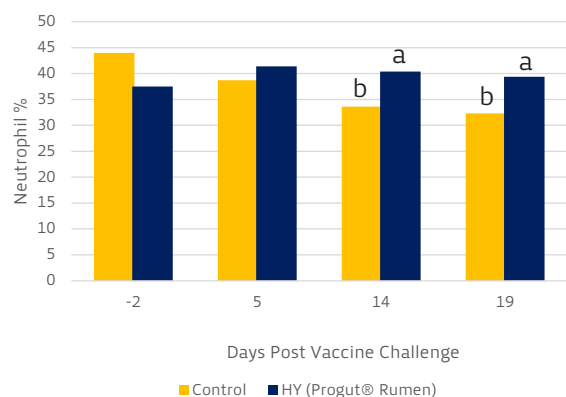
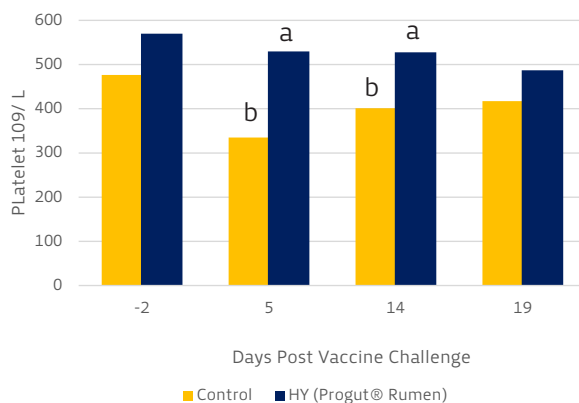


Figure 3b Effect of HY on platelet levels after vaccine challenge



a,b P<0.05

Reduction in serum lactoferrin after microbial infection was seen in both groups but the response was less pronounced in the HY group. Lactoferrin, an iron-binding glycoprotein, is known to exert bactericidal activity as well as immunoregulatory functions upon microbial challenge. Acute phase proteins provide enhanced protection against microorganisms and modify inflammatory responses through cell trafficking and mediator release. Haptoglobin is considered to be a representative acute phase protein in cattle. Calves receiving HY showed a significant elevation of serum concentration of haptoglobin after microbial infection, while such a change was not seen in the control group

CONCLUSION

Hydrolyzed yeast addition to a calf starter feed enhanced the production of immune-related serum proteins, particularly bacteria- and virus- specific IgA and haptoglobin, after microbial challenge. This indicates a better immunocompetence against microbial infection and led to improved general health conditions of calves during the neonatal period.

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