

# Effects of an oral *Echinacea purpurea* alcoholic spissum extract in calves

## A placebo-controlled, randomized, double blinded study

### Background

Antimicrobial resistance resulted in international accordance to strengthen the research to investigate novel treatment options including medicinal plants. To investigate the effect of two dosages of an orally hydro-ethanolic *Echinacea purpurea* (L.) MOENCH spissum extract (EP) on performance, clinical health, antibody production, red and white blood cell count and expression of immunological parameters in calves, a double-blinded placebo-controlled clinical trial has been performed.

### Material and Methods

The calves were randomly enrolled in three groups (each n = 9): placebo (1) and two doses of EP (0,3 g EP/days: 2; 3 g EP/day: 3). The animals were vaccinated twice with a bluetongue virus (BTV) vaccine, serotype 4 on day 14 and 21 and were brought to a new farm on day 28. Body weight (weekly), clinical health and milk intake (daily) were recorded. Blood samples were analysed with ELISA for BTV antibodies (day 14, 21, 28 and 56), white and red blood cell count (weekly) by flow cytometry and for the mRNA abundance of a variety of inflammatory factors via real time quantitative PCR (directly before and 24 hours after vaccinations) (Figure 1).

### Results

Preliminary findings based on least square means (using linear mixed effect models and Tukey's post-hoc analysis in the R environment version 3.2.5) show that EP reduced the days of diarrhoea in group 2 compared to 1 for 44 % (p = 0.03; Figure 2) and increased the body temperature in EP calves on day 28, 29 and 32 significantly. No effect of EP was found on blood cell counts, except for mean eosinophil granulocytes which were reduced in the group 2 compared to 1 (p = 0.01). Milk intake, weight gain, incidence of respiratory diseases and drug consumption as well as mRNA abundance of IL-1β and -8, TNFα and COXII showed no differences. However, mRNA abundance of prostaglandin-synthase was significantly increased in group 2 and 3 compared to 1 after 1. vaccination. The effect of EP on BTV antibody production could not be interpreted, due to the fact that 13 of 27 calves have received BTV antibodies before the first vaccination from their mothers, vaccinated the last time 6 years before (Figure 3 [Ayrle et al., 2018]).

### Discussion

Measured effects might be due to immune modulation of EP known from the literature (Ayrle et al., 2016). Diarrhoea reducing effects might be explained by stimulation of the local enteric immune system of calves by EP. There is a need for further research focused on the effects of EP in bovines to draw final conclusions.

The colostrum transmission of BTV antibodies from dams to calves 6 years after vaccination has been proven for the first time (Ayrle et al., 2018).

Figure 1

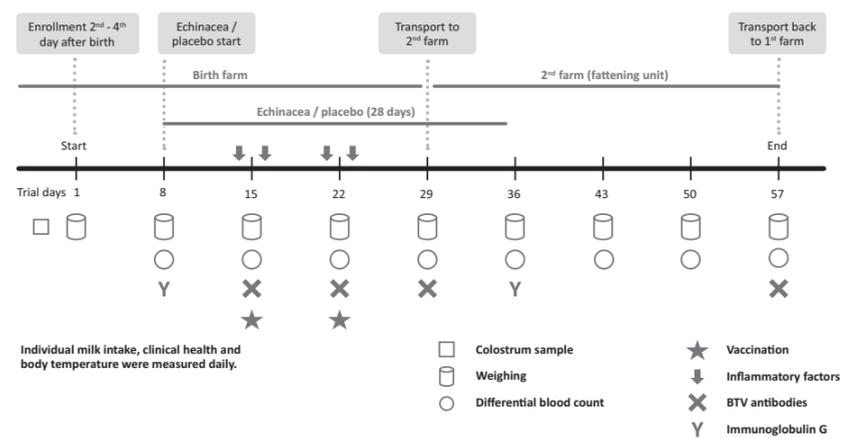


Figure 2

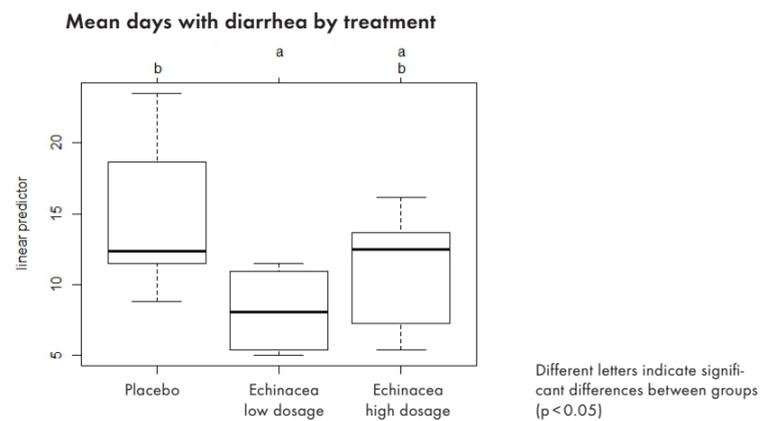
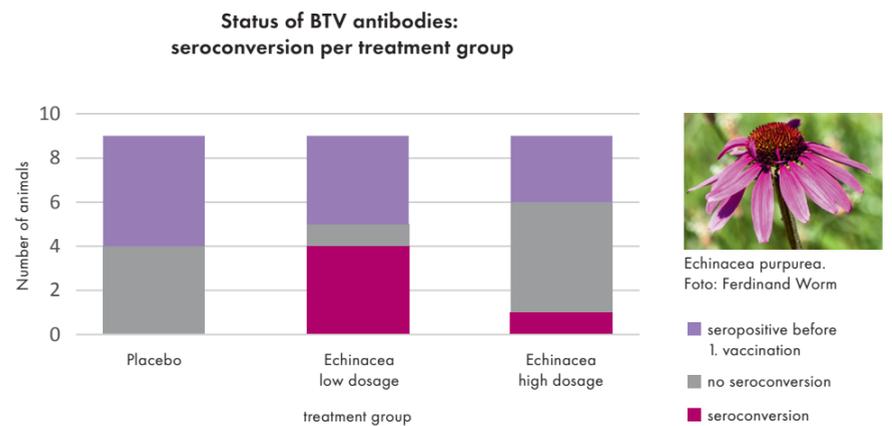


Figure 3



Echinacea purpurea. Foto: Ferdinand Worm

seropositive before 1. vaccination  
 no seroconversion  
 seroconversion

### Literature

Ayrle, H., M. Mevissen, M. Kaske, A. Vöglin, R. Fricker, B. Hoffmann, M. Büttner, Z. Marinovic and M. Walkenhorst, 2018: Colostral transmission of BTV-8 antibodies from dairy cows six years after vaccination. *Vaccine*.

Ayrle, H., M. Mevissen, M. Kaske, H. Nathues, N. Gruetzner, M. Melzig and M. Walkenhorst, 2016: Medicinal plants - prophylactic and therapeutic options for gastrointestinal and respiratory diseases in calves and piglets? A systematic review. *BMC veterinary research*, 12, 89.