Research Notes B-74

Arm & Hammer Animal and Food Production

CELMANAX reduced mycotoxin damage to gut tissue *in vitro* and helped reduce Hemorrhagic Bowel Syndrome (HBS) symptoms in calves.

STUDY OVERVIEW

- This trial[1] was conducted to determine the impact of CELMANAX™ on:
  - Mycotoxin cytotoxicity *in vitro* caused by moldy feed extracts
  - Progression of Hemorrhagic Bowel Syndrome (HBS) in beef cattle
- The trial included two beef feedlots in southern Alberta, Canada, reporting outbreaks of sudden death.
- Samples of barley silage and dry hay from the feedlots were evaluated for presence of mycotoxigenic fungi and mycotoxins.
- Jejenual tissue samples were collected from HBS-affected animals from both feedlots and examined for pathologies and associated bacterial pathogens.
  - Samples of jejunum from 6 steers from a local abattoir served as negative controls.
- Feedlot 1: 16 affected calves were treated with 400 mL of CELMANAX Liquid.
- Healthy colon cells were combined with moldy forage extract samples in the presence or absence of 0.1% CELMANAX and cytotoxicity was measured.

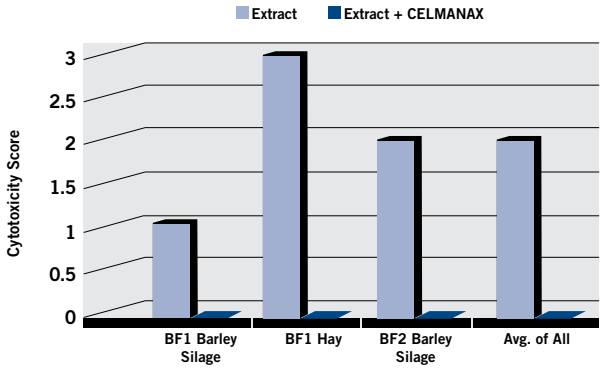
RESULTS

- Mycotoxigenic fungi were isolated from barley silage and hay from both feed lots (Table 1).

TABLE 1	Percent of forage samples positive for mycotoxigenic fungi from two beef feedlots (BF1, BF2) (n=5 – 10 samples/forage source)		
Mycotoxigenic Fungi	**BF1 Barley Silage**	**BF2 Barley Silage**	**BF1 Hay**
Fusarium poae	0	0	100
Fusarium verticilloides	100	100	0
Fusarium sporotrichiodes	100	0	0
Aspergillus furnigatus	0	100	0
Penicillium raqueforti	100	100	100

- Jejunal tissue samples from affected cattle showed common pathologies, including *E. coli* pathogens expressing the Stx1 and Stx2 shiga toxin genes, key virulence traits associated with severe forms of human and animal disease. Jejunal samples from control animals did not show similar pathologies.
- Eleven of the 16 affected calves treated with CELMANAX returned to good health within 48 hours, indicating the CELMANAX dosage appears to have aided in the return to feed consumption and good health.
- Five of the 16 affected calves, all of which suffered from hind limb paralysis within 24 hours of receiving moldy hay, did not regain mobility and eventually died.
- Moldy forage extracts from both feedlots caused severe cytotoxicity to healthy colon cells *in vitro*. Inclusion of 0.1% CELMANAX eliminated these cytotoxic effects (Fig. 1).

FIGURE 1: Cytotoxicity score of extracts of moldy forages, with or without 0.1% CELMANAX (n=6)



CONCLUSIONS

- A single dose of 400 mL of CELMANAX Liquid reversed disease progression in 11 of 16 calves demonstrating advanced mycotoxicosis and presumptive HBS.
- 0.1% CELMANAX eliminated cytotoxic effects of extracts from moldy forages *in vitro*.

#ScienceHearted

AHfoodchain.com

[1] Adapted from the data of: Baines, et al. Moldy feed, mycotoxin and Shiga toxin-producing *Escherichia coli* colonization associated with Jejunal Hemorrhage Syndrome in beef cattle. *BMC Veterinary Research* 2011;7:24.