Research Notes

Arm & Hammer Animal and Food Production

Study shows that CELMANAX increased body weight gain and decreased serum cortisol concentrations in program-fed beef heifers.

INTRODUCTION

Calves often experience negative effects on immune function as a result of environmental stressors during weaning. Decreased body weight (BW) and average daily gain (ADG)[1,2] are associated with stress as well as increased concentrations of cortisol and norepinephrine.[3,4]

Calves introduced to chronic stressors are more susceptible to diseases.[4] The economic impact of non-predator death loss of calves was over $1.5 billion in 2015.[5] This equated to 2,144,000 calves due to respiratory problems (26.9%), calving related problems (17.8%) and digestive problems (15.4%).[5]

STUDY OVERVIEW

A study[6] was conducted to determine the effects of CELMANAX™ on growth and performance, feed efficiency and cortisol concentrations of beef heifers.

Seventy-two commercial Angus heifers from two AI sires were blocked (n=9) by body weight, randomly assigned to one of two pens (4 heifers per pen) per block and assigned to treatments. Heifers were fed a commercial total mixed ration (TMR) twice daily from d0 to d60 to gain 0.75 kg/day. Feed was top-dressed twice daily with either 18g CELMANAX or corn germ (control) per animal per day.

Two heifers per pen (n=32) were randomly selected for a transportation challenge to evaluate stress response on d62 or d63. Sixteen heifers (n=8 CELMANAX, n=8 control) were randomly selected for a corticotropin-releasing hormone/arginine vasopressin (CRH/AVP) challenge and intravenous glucose tolerance test on d64 and d67. Body weights were obtained and blood samples were drawn approximately every 15 days.

RESULTS

- Body weight gain increased and feed conversion improved (*P*=0.04) in CELMANAX-fed heifers compared to control heifers (Table 1).

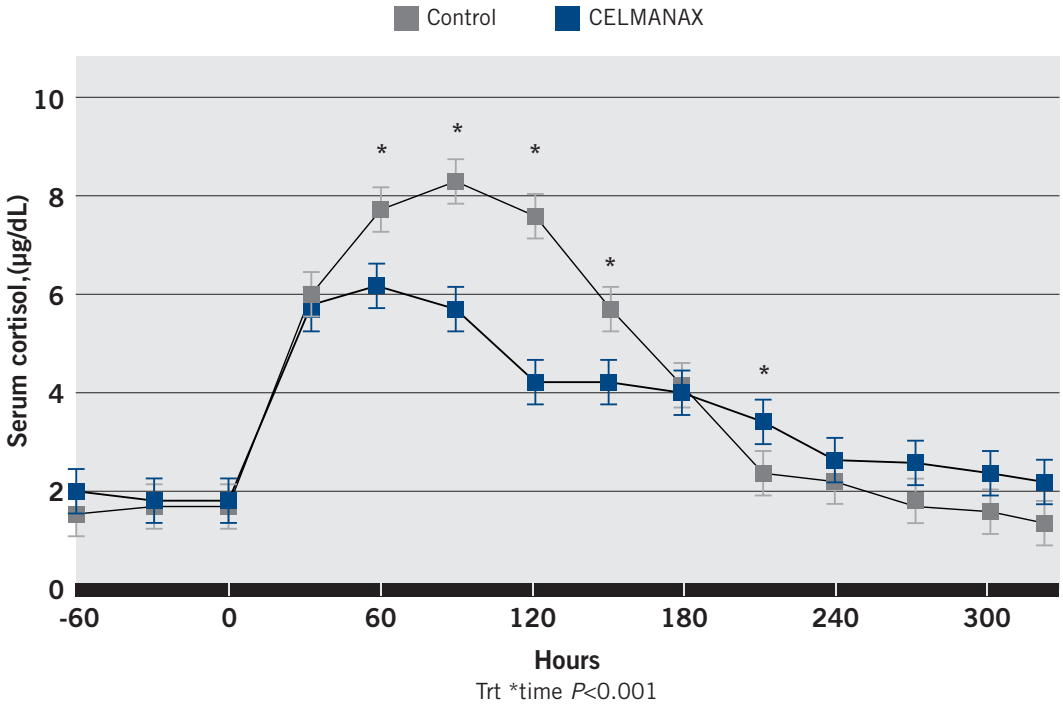
TABLE 1 Heifer BW, feed consumption, and feed conversion efficiency of heifers fed a total mixed ration top dressed with corn germ meal (CON) or CELMANAX (CEL) throughout the 60d feeding trial.

Item	CON	CEL	SEM	*P*-value
N	9	9	-	-
Initial BW, kg	242	243	8	0.983
D30 of trial BW, kg	260	263	8	0.878
D60 of trial BW, kg	282	286	5	0.584
BW gain during trial, kg	40	43	1	0.040
Pen feed intake, kg	2,273	2,272	43	0.987
Feed conversion, kg intake/kg BW gain	14.65	13.35	0.39	0.036

Data presented LSM ± SEM

- On d30 to d60 post-weaning, serum cortisol concentrations were decreased ($P<0.01$) in CELMANAX™-fed heifers compared to control heifers.
- During the transportation challenge, serum cortisol concentrations were also decreased ($P<0.05$) in CELMANAX-fed heifers compared to the control.
- During the CRH/AVP challenge, serum cortisol concentrations were decreased ($P<0.05$) from 60 to 150 minutes post-infusion in heifers fed CELMANAX compared to the control (Fig. 1).

FIGURE 1: Serum cortisol concentrations (µg/dL) of heifers fed corn germ meal (CON) or CELMANAX (CEL) during corticotrophin-releasing hormone/arginine vasopressin challenge following the 60d feeding trial.



Asterisk (*) signifies a significant difference between treatments at that time point ($P<0.05$).

CONCLUSION

In this study, feeding CELMANAX post-weaning increased body weight gain and reduced cortisol concentrations in challenged beef heifers.

#ScienceHearted

AHfoodchain.com

1 Arthington JD, Spears JW, Miller DC. The effect of early weaning on feedlot performance and measures of stress in beef calves. *J Anim Sci* 2005;83(4):933–939.
2 Preedy GW, Jaeger JR, Waggoner JW, Olson KC. Effects of early or conventional weaning on beef cow and calf performance in pasture and drylot environments. *J Anim Sci* 2016;94:610.
3 Lay Jr DC, Friend TH, Randel RD, Bowers CL, Grissom KK, Neuendorff DA, Jenkins OC. Effects of restricted nursing on physiological and behavioral reactions of Brahman calves to subsequent restraint and weaning. *Appl Anim Behav Sci* 1998;5:109–19
4 Hickey MC, Drennan MM, Earley B. The effect of abrupt weaning of suckler calves on the plasma concentrations of cortisol, catecholamines, leukocytes, acute-phase proteins and *in vitro* interferon gamma production. *J Anim Sci* 2003;81:2847–2855.
5 USDA. Cattle and calves death loss in the United States due to predator and Nonpredator causes. Fort Collins, CO: USDA–APHIS– VS–CEAH; 2015. #745.1217.
6 Danielo J, et al. Effects of post-weaning supplementation of immunomodulatory feed ingredient on body weight and cortisol concentrations in program-fed beef heifers. *Domestic Animal Endocrinology* 2020;72 Article 106427.