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Summary

Cross-bred yearling steers were used in a feeding trial to compare the use of two different direct fed microbials (DFM), ProTernative CF (DFM-CF) and ProTernative SF (DFM-SF). The treatment design was a 2x2 factorial with a control (no DFM), DFM-CF, DFM-SF, and both (CF+SF). Diets consisted of 40% WCGF with high moisture corn with no feed additives other than the DFM treatments. No differences were observed in feedlot performance or carcass characteristics.

Introduction

The two direct fed microbials (DFM) under investigation from Ivy Natural Solutions were ProTernative Continuous Formula (Saccharomyces cerevisiae, strain I-1077) and ProTernative Stress Formula (Saccharomyces cerevisiae boulardii, strain I-1079). These DFMs have been evaluated for their respective performance and health effects but not in direct comparison to one another in typical high grain finishing diets with corn byproducts. The objective of the present trial was to evaluate live performance and carcass characteristics for steers receiving a feedlot finishing diet with corn milling byproducts with or without each DFM.

Procedure

Three hundred and twenty cross-bred yearling steers (712 ± 16 lb) were used in a feeding trial at the University of Nebraska–Lincoln Research feedlot located at Mead, Neb. Steers were limit fed for 5 days at 2% BW. Individual BWs were collected for two consecutive days (day 0 and day 1) with steers blocked by 3 weight groups (heavy, medium, and light). Treatments were randomly assigned to pens. Treatment replications were: one in the heavy block, three in the medium weight block, and four in the light block, for a total of 8 replications per treatment. Steers were housed in outdoor pens with ten steers per pen. On day 1, steers were implanted with Component TE-C (Vet Life). Steers were re-implanted on day 72 with TE-S (Vet Life).

All steers were fed a common diet with the only difference between treatments being the DFM delivered. Treatments for this experiment were arranged as a 2x2 factorial design, with a control diet containing no DFM (CON). The other three treatments were ProTernative Continuous Formula containing Saccharomyces cerevisiae, strain I-1077 (DFM-CF); ProTernative Stress Formula containing Saccharomyces cerevisiae boulardii, strain I-1079 (DFM-SF); and a combination of both (CF+SF). Steers were adapted to the finishing diet with decreasing levels of alfalfa and increasing levels of HMC. Four adaptation diets were delivered for 3, 4, 7, and 7 days, respectively. The finishing diet for the steers consisted of 50% HMC, 40% WCGF (Sweet Bran, Cargill Inc., Blair, Neb.), 5% corn stalks, and 5% supplement. No Rumensin or Tylan was fed in any of the diets (Table 1). DFM treatments were added directly to the truck prior to feed delivery. Five pounds of DFM were mixed in the feed truck to deliver 2 oz of DFM to each steer daily, to ensure 0, 400, 500, or 900 mg of active ingredients were delivered for the CON, DFM-CF, DFM-SF, and CF+SF treatments, respectively.

Steers were fed for 162 days, then slaughtered at a commercial abattoir (Greater Omaha Packing, Omaha, Neb.). At time of slaughter, hot carcass weights (HCW) and liver scores were collected. Livers were scored using 0 (no abscesses), A-, A, and A+ (severely abscessed). Carcasses were then chilled for 48 hours, after which back fat thickness, LM area, and marbling scores were collected. Yield grade was calculated based on LM area, back fat thickness, marbling score, HCW, and 2.5% kidney, pelvic, and heart fat (KPH).

Data for this experiment were analyzed using the PROC MIXED procedure (SAS Inc.). Treatment and block were included as fixed effects. Treatments were analyzed as a factorial. If the interaction between DFM-CF and DFM-SF was significant, the simple effects were analyzed. If no interaction was observed, only the main effects of either DFM-CF or DFM-SF are presented. Means were separated using least square means separation procedures of SAS. Chi-square analysis was performed on the individual liver scores to determine treatment effects.

Results

No interactions were observed ($P > 0.27$) between the DFMs in this study for feedlot performance (Table 2). Final BW and ADG were not impacted by treatment ($P > 0.58$). Dry matter intake was not influenced by DFM-CF ($P = 0.95$); however, steers fed DFM-SF tended ($P = 0.09$) to have greater DMI than CON or DFM-CF steers. However, no differences in G:F were observed due to treatment ($P > 0.63$).

No interaction was observed between DFMs for carcass characteristics ($P > 0.27$). Hot carcass weight was not impacted by treatment ($P > 0.59$), with an overall average of 856 lb. Fat thickness averaged 0.53 in

Table 1. Adaptation and finishing diet composition.

Days	1-3	4-7	8-14	15-21	22-162
Diet	1	2	3	4	Finisher
WCGF	40.0	40.0	40.0	40.0	40.0
HMC	16.0	26.0	36.0	43.5	51.0
Corn stalks	5.0	5.0	5.0	5.0	5.0
Alfalfa hay	35.0	25.0	15.0	7.5	0.0
Supplement	4.0	4.0	4.0	4.0	4.0
CP, %	17.2	16.6	16.0	15.6	15.2

WCGF = wet corn gluten feed (Sweet Bran® supplied by Cargill, Blair, NE); HMC = high moisture corn; CP = crude protein. Supplement contained no Rumensin® or Tylan®.

Table 2. Feedlot and performance data of steers receiving different direct-fed microbial treatments.

	CON	DFM-CF	DFM-SF	CF+SF	SE	Int.	CF	SF
Initial BW, lb	735	734	735	735	1	0.71	0.33	0.71
Final BW, lb	1395	1379	1388	1398	12	0.27	0.80	0.58
DMI, lb/d	26.3	26.0	26.4	26.7	0.2	0.29	0.95	0.09
ADG, lb	4.02	3.93	3.98	4.04	0.07	0.31	0.87	0.63
G:F	0.155	0.153	0.153	0.153	0.003	0.59	0.78	0.63
HCW, lb	879	869	875	881	7	0.27	0.80	0.58
Marbling[2]	506	512	520	539	11	0.54	0.28	0.07
LM area	13.3	13.2	13.2	13.2	0.2	0.85	0.78	0.82
Fat depth	0.55	0.57	0.54	0.54	0.02	0.75	0.48	0.34
YG calc.[3]	3.0	3.0	2.9	3.0	0.1	0.69	0.65	0.69

[1]None = 0 DFM; CF = ProTernative DFM CF; SF = ProTernative DFM SF; CF+SF = ProTernative DFM CF and SF.
[2]Marbling score: 400 = Slight^0, 500 = Small^0, etc.
[3]Yield grade (YG) calculated using the equation (2.5 + (2.5*fat thickness) + (0.2*2.5% KPH) + (0.0038*HCW lbs) – (0.32* LM area in^2)).

and was not impacted by treatment ($P > 0.40$). No differences in LM area were observed ($P > 0.79$) with the overall average of 13.1 in^2 ($P > 0.79$). There was a tendency for marbling score to be greater for steers receiving the DFM-SF ($P = 0.07$) treatment compared to DFM-CF. Liver scores were categorized and no differences for A+/adhered abscesses ($P > 0.46$), A abscesses ($P > 0.28$), or no abscesses ($P > 0.11$) were observed. There was, however, a tendency for CON steers to have more A- liver abscesses than steers in all other treatments ($P = 0.06$); 11 steers had A- liver scores compared with 7, 2, and 5, respectively, for DFM-CF, DFM-SF, and CF+SF treatments. For finishing diets containing 40% WCGF, and low-stress steers, no positive impacts were observed for using either DFM in this study.

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