Effectiveness of High Inclusion Liquid Feed for Finishing Steers

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Objective: This study was conducted at South Dakota State University, Brookings, SD with Dr. Robbi Pritchard as the primary investigator. The primary objective was to determine the relative feed value of a high inclusion liquid supplement for use in finishing diets fed to yearling steers.

Diets: Treatments consisted of **Control**, 3% inclusion meal supplement; **Typical**, 4.5% inclusion liquid supplement; and **High**, 9.0% inclusion liquid supplement (QLF Energy Balancer). Supplements were formulated to provide dietary monensin at 30 g/T, similar levels of DIP, vitamins and minerals. As liquid supplement inclusion increased, dry rolled corn inclusion decreased. Three transition diets were used for adapting steers to the final diets. Final test diets (Table 1) were first delivered on d 19 of the study.

Table 1. Finishing Diets Fed Starting on d19[1]

	Control	Typical	High
	% of DM		
Corn Silage	8.0	8.0	8.0
DRC	35.0	33.5	29.0
HMC	34.0	34.0	34.0
mDGS	20.0	20.0	20.0
Supplement	3.0	4.5	9.0

[1]DM basis

Cattle: The steers used for this study (n=119, BW=930 lb, sd=57) were from a single origin. Initial processing was done the morning after arrival and included weighing, tagging, vaccinating, and treating for parasites according to standard SDSU facility protocols. Steers were then randomly assigned to one of three treatments and pen based on initial BW. The study included 15 pens, 5 replicate pens per treatment. Subsequent individual BW were measured in the morning, before feeding , on days 28, 56, 84, 105 and 119. Steers were implanted with Revalor 200 on d 28. The final live BW were recorded the morning before harvest. The targeted end point for feeding was when the entire population was estimated to have 0.50 in to 0.55 in ribfat thickness (visual appraisal). Steer identity was maintained through the abattoir. Video image analysis was employed to retrieve carcass quality and cutability data.

Table 2. Cumulative Steer Performance

	Treatment				Contrasts[1]	
	Control	Typical	High	SEM	Dry vs Liquid	Typical vs High
Shrunk Basis[2]						
Final BW, Lb	1339	1345	1361	7.6	0.17	0.17
ADG, lb/d	3.56	3.59	3.77	0.062	0.17	0.08
DMI, lb	24.07	23.42	23.69	0.279	0.17	--
F/G	6.75	6.53	6.29	0.084	0.01	0.09

[1]Probability>0.20 not depicted, [2]3% shrink applied to d119 BW
[3]Calculated Final BW=HCW/0.625

Results: Liquid supplementation numerically (P = 0.17) improved cumulative ADG and final BW compared to Control (Table 2). Typical and high liquid supplementation improved F/G 3.3 and 6.8%, respectively, compared to dry supplementation. This is consistent with previous studies conducted at SDSU comparing supplement form (Pritchard, 1993). The incremental improvement (P < 0.09) in F/G comparing the Typical to the High diet suggests that the net energy value of the High supplement exceeded the net energy value of the DRC that it replaced. The High supplement also tended (P = 0.08) to cause faster ADG than the Typical supplement. Additionally, final BW were numerically increased 6 and 22 lbs for typical and high liquid supplementation, respectively. Through 85 days on feed, BW was essentially identical between treatments. Over the final 35 days on feed (Table 3), ADG

was improved 3.6 and 12.5% and F/G improved 7.7 and 12.5% by use of liquid supplement at typical or high levels, respectively. The final 30 days on feeds is the most inefficient time period in the feedlot, improvements made to productivity during this time frame is important to enhance profitability.

Overall carcasses graded 86% Choice or better and 46% Premium Choice and Prime. Supplementation did not affect Quality Grade (Table 3). Even though not statistically significant, liquid supplementation numerically increased HCW by 6 and 12 lbs for typical and high, respectively. Liquid supplementation also increased carcass leanness based on the reduction (P = 0.01) in ribfat, Yield Grade (P = 0.07), and numerically increased REA (P = 0.14).

Summary: There were no adverse events such as metabolic disorders or reduced Quality Grade associated with feeding typical or high levels of liquid supplements. Liquid supplements improved growth efficiency, which has been observed before and attributed to improved mix quality and subsequent uniformity of nutrient intake. The High inclusion supplement led to more efficient production than the Typical inclusion. This is probably not due to further improvements in mix quality. The more likely explanation is that either the composition of the High inclusion supplement contained more useful energy than the DRC that it replaced and/or the supplements components had a positive effect on rumen digestibility and utilization of nutrients. Feed efficiency is an important measurement in feedlot production and, as shown in Figure 1, is important to feedlot profitability. According to this trial, using todays economics and assuming only an impact on F/G, a 10,000 head feedlot could improve profitability approximately $90,000 annually by feeding a conventional liquid supplement. Feeding a high inclusion liquid supplement would be worth $175,000 annually including a 0.5% increase in ration cost.

Table 3. Day 85-119 Steer Performance

	Treatment				Contrasts[1]	
	Control	Typical	High	SEM	Dry vs Liquid	Typical vs High
d_84 BW	1235	1235	1239	6.2		
d_119 BW	1381	1387	1404	7.8	0.17	0.17
85-119 d						
ADG	4.18	4.33	4.70	0.067	0.003	.004
DMI	28.01	26.77	27.63	0.453	0.183	--
F/G	6.72	6.20	5.88	0.100	0.001	0.055

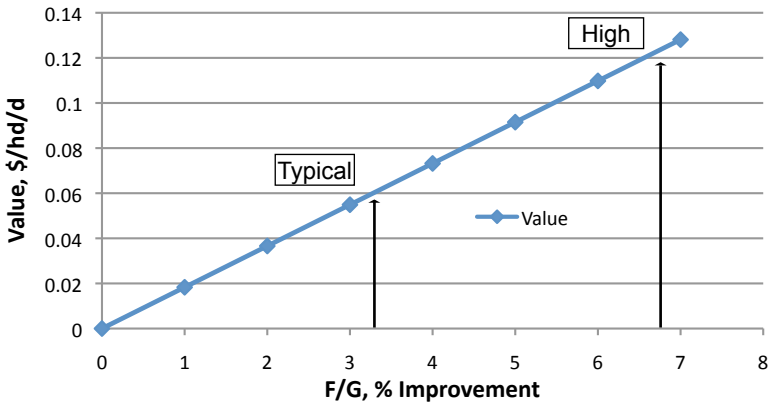
[1]Probability>0.20 not depicted

Table 4. Carcass Traits[1]

	Treatment				Contrasts[2]	
	Control	Typical	High	SEM	Dry vs Liquid	Typical vs High
Dress,%[3]	62.66	62.80	62.46	0.327	--	--
HCW, Lb	839	845	851	6.2	--	--
REA, in²	12.62	12.77	13.13	0.162	0.14	0.15
Ribfat, in	0.56	0.53	0.49	0.013	0.01	0.10
KPH, %	1.99	1.95	1.97	0.022	--	--
Marbling[4]	594	602	587	16.3	--	--
Yield Grade	3.49	3.38	3.25	0.068	0.07	--

[1]Pen mean basis, [2]Probability>0.20 not depicted, [3]HCW as % shrunk BW, [4]400=Slight[0]; 500=Small[0]

Figure 1. Impact of F/G on feedlot profitability based on $150/ton (DM) Feed Cost[1]



[1]Assumes no other impacts on any performance variables

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