Coproducts Score

High-fat coproducts are a go for early-weaned calves, fostering higher marbling scores in a more cost-efficient package than traditional concentrates.

*by **Barb Baylor Anderson,** field editor*

The feed chosen by producers as an energy source in young calf diets can have an effect on both animal performance and carcass characteristics. Researchers increasingly find that coproduct feeds as alternatives to traditional high-concentrate diets used in calf rations can lead to high-quality carcasses with high marbling scores following finishing.

"Biofuel production coproducts may be cost-efficient options in many instances for early-weaned calves," says Travis Meteer, University of Illinois Extension beef specialist. "Previous calf diet research used fiber-based coproducts like corn gluten feed, soyhulls and wheat middlings. Now we have data that evaluates high-fat dried distillers' grains with solubles (DDGS) and corn bran in early-weaning and creep-feeding diets."

WEANING Strategies

Meteer evaluated weaning age and source of energy on cattle performance and carcass characteristics. He found early weaning improved gains in the growing phase and marbling scores when compared to creep feeding. However, he also discovered creep-fed calves had higher gains and were more efficient than early-weaned calves in the finishing phase.

"No differences in carcass characteristics were found due to source of energy. This suggests that high-fat coproducts could be as effective as corn or starch-based diets in initiating marbling in young calves, providing more feeding options," he says.

Study specifics

Two hundred, spring-born Angus and Simmental-Angus calves from the University of Illinois Beef Field Research Laboratory and Orr Research Center were part of the study. Calves were placed into five groups: early-wean starch (EWS), early-wean fiber (EWF), creep-fed starch (CFS), creep-fed fiber (CFF) and control (CON).

Control calves were weaned at traditional times and received no additional feed while grazing with dams on pasture. Early weaning occurred at 120-150 days of age.

"Previous research has evaluated weaning at breeding or 50-60 days of calf age in some instances, but I prefer 120 days," says Meteer. "Calves can meet requirements up to 3 months of age on their mothers' milk and then can meet the nutrition gap with forage up to 120-150 days."

For the growing phase, Meteer reports early-weaned cattle had the highest average daily gain (ADG), and control calves had the lowest. No differences in ADG were reported due to source of energy. During the growing phase, EWS calves had lower intake and were 13% more efficient than EWF calves, with no differences found between sources of energy in feedlot performance. All cattle were on a common finishing diet in the feedlot.

When comparing early-weaned and creep-fed cattle in the finishing phase, Meteer found creep-fed calves had 8.5% higher gains, 6.5% lower intakes and were 15.6% more efficient. The reason behind lower intakes of the creep-fed calves is unknown. CON calves, when compared to the average of all other treatments, were more efficient in the feedlot and may have compensated for lower performance during the experimental-growth phase. They also spent 19 more days on feed than the average to reach harvest.

"Despite spending more days on feed, CON cattle had less backfat than the average of the remaining treatments, which is significant since cattle were selected to be harvested at a target backfat," he says. "Previous studies have shown lower hot carcass weight (HCW) in early-weaned cattle, but we saw no differences. CON cattle had lower percent kidney, pelvic, heart (KPH) fat than the remaining treatments. Creep-fed cattle had a larger LMA (longissimus muscle area), but when LMA was reported per 100 kilograms of HCW, there were no differences between creep-fed cattle and early-weaned cattle."

Meteer says no differences were noted in carcass yield grade (YG) or percentage of cattle that were YG 1, 2, 3 or 4, either. Early-weaned calves had higher marbling scores than creep-fed cattle. Early-weaned and creep-fed calves combined had higher marbling scores than CON cattle. Both early-weaned and creep-fed cattle graded more than 90% USDA low-Choice. Early-weaned calves graded a higher percentage average-Choice or better, low-Prime or better and *Certified Angus Beef*® (CAB®) than creep-fed. No differences in marbling score or quality grade were found when evaluating energy source.

"Distillers' grains and corn bran have higher fat than products used in previous studies," he says. "Different outcomes show high-starch and marbling in early-wean calves. Now with higher-fat coproducts, there is comparable marbling, so we believe there

Consider high-starch options

Previous work at the University of Illinois found high-quality carcasses start with high-starch diets in calves as early as possible. Research showed calves fed high-starch diets early in life had more marbling at the same backfat as calves grown on forages. In addition, the amount of starch in the finishing diet was not as critical as starch at a young age.

The data showed calves would need to be on creep feed for about 80 days to increase quality grade. When comparing the carcass traits of various feeding scenarios, research found on average, normal-weaned steers without creep had lighter carcasses than other steers. Marbling score was greater for early-weaned steers than those receiving creep feed. However, early-weaned steers had a greater percentage of average-Choice or higher carcasses compared to the creep-fed steers.

Research also indicated weaning calves at 150 days improved quality grade dramatically and improved feed efficiency in the feedlot. Researchers found a 30% increase in calves that graded average-Choice or above with weaning at 150 days and a slight increase in carcass weights of early-weaned calves compared to non-creep-fed calves.

Table 1: Effects of weaning age and source of energy on calf performance, feedlot performance and carcass traits

	Treatments[a]					Contrasts[b]			
Item	EWS (1)	EWF (2)	CFS (3)	CFF (4)	CON (5)	1 vs. 2	3 vs. 4	1&2 vs. 3 & 4	1,2,3,4 vs. 5
No. of pens	5	5	5	5	5				
				Growing					
Start wt., lb.	389	385	389	393	387	0.81	0.80	0.67	0.92
ADG, lb.	3.58	3.56	3.36	3.30	2.64	0.87	0.34	<0.01	<0.01
DMI, lb.	13.11	15.04	–	–	–	<0.01	–	–	–
Supp. DMI, lb.	–	–	8.42	7.56	–	–	0.66	–	–
F/G	3.70	4.18	–	–	–	<0.01	–	–	–
Supp. F/G	–	–	10.41	10.40	–	–	0.96	–	–
Final wt., lb.	743.6	741.4	726.0	719.4	644.6	0.93	0.81	0.26	<0.01
				Feedlot					
Start wt., lb.	743	741	726	719	644	0.93	0.81	0.26	<0.01
ADG, lb.	3.22	3.21	3.47	3.54	3.52	0.63	0.56	<0.01	0.09
DMI, lb.	23.3	22.7	21.7	21.5	22.2	0.31	0.82	<0.01	0.77
Final wt., lb.	1,117	1,185	1,185	1,218	1,190	0.81	0.33	0.37	0.94
F/G	7.14	7.04	6.21	6.06	6.25	0.61	0.29	<0.01	<0.01
Days on feed	135	139	134	140	156	0.49	0.28	0.97	<0.01
				Carcass					
HCW, lb.	730	734	734	752	737	0.82	0.39	0.41	0.97
Backfat, cm	0.48	0.48	0.48	0.48	0.44	0.64	0.99	0.72	0.02
KPH, %	2.19	2.21	2.16	2.12	2.08	0.72	0.46	0.07	0.04
LMA, in.^{2}	11.8	11.6	12.1	12.3	12.3	0.35	0.61	0.03	0.13
LMA, in.^{2}/cwt.	1.00	0.98	1.02	1.00	1.03	0.12	0.46	0.18	0.08
Avg. YG	2.59	2.63	2.48	2.64	2.43	0.78	0.22	0.63	0.11
YG 1, %	0.0	2.6	0.0	0.0	2.5	0.26	1.00	0.43	0.31
YG 2, %	48.7	34.2	54.1	37.8	52.5	0.21	0.16	0.58	0.32
YG 3, %	43.2	60.5	43.2	59.5	45.0	0.14	0.16	0.95	0.46
YG 4, %	8.1	2.6	2.7	2.7	0.0	0.18	1.00	0.36	0.20
Marb. score[c]	574	598	506	493	476	0.30	0.57	<0.01	<0.01
≥ low-Ch, %	91.9	100.0	89.2	91.7	75.0	0.24	0.72	0.26	<0.01
≥ avg.-Ch, %	78.4	81.6	51.4	41.7	40.0	0.76	0.37	<0.01	<0.01
≥ low-Pr, %	13.5	23.7	8.1	0.0	0.0	0.11	0.20	<0.01	0.02
% CAB®	75.7	76.3	45.9	41.7	35.9	0.95	0.69	<0.01	<0.01

[a]EWS = early wean, starch-based diet; EWF = early wean, fiber-based diet; CFS = normal wean, creep-fed starch diet; CFF = normal wean, creep-fed fiber diet; CON = normal wean, no creep.

[b]Contrasts: EWS vs. EWF; CFS vs. CFF; EWS and EWF vs. CFS and CFF; and EWS, EWF, CFS and CFF vs. CON.

[c]400 = low-Choice, 500 = avg. Choice, 600 = high-Choice.

must be some sort of shift in acetate-to-propionate ratio and blood glucose level due to fat."

Since the high-fat coproducts have similar marbling results to high-starch diets, Meteer says producers can feed more during creep feeding and early weaning and have a better chance of hitting premium-Choice grades and better carcass quality.

Better marbling

"Early-weaned cattle marble better and have a higher percent average-Choice, and that has not changed. We are getting a higher start on nutrition early in life," he says. "For producers who choose to go the early-weaning route, know that younger calves require you maintain top herd health. Otherwise, you could have a train wreck. Add a good vaccination protocol to your system when transferring away from mother's milk."

For producers who feed high-fat coproducts, also consider some analysis.

"Ethanol plants may de-fat a portion of DDGS to sell the corn oil. You have to know what level of fat your coproduct is. Our coproduct was 9%," he says. "We have not evaluated corn condensed distillers' solubles (CCDS) in calf diets at the University of Illinois."

Finally, Meteer encourages producers to pencil out the economics to determine if the high-fat coproduct, early-wean strategy will pay.

"Determine your market, and price everything. If you market on a grid, this route may be a good idea, but if you market by the pound, it may not. Determine if you have any incentive to line up genetics, feeding and implant strategies," he says. "Consider high-fat coproducts to help initiate marbling in young calves if you are selecting for carcass and have a premium genetic package. If you are targeting white-tablecloth restaurants with high-quality, premium-Choice beef, this may be the way to go."

Editor's Note: *A former National Junior Angus Association board member, Barb Baylor Anderson is a freelance writer and marketing specialist from Edwardsville, Ill.*