Making The Most of Low Quality Forages

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The beef cattle industry relies heavily on the use of high forage diets to maintain the cow herd, develop replacement females and sustain stocker operations. In many cases these forage-based diets lack the nutritional content needed to meet the requirements of the herd. Treating low-quality forages with liquid supplements can increase both intake and digestion, provide additional vitamins and minerals and also reduce forage waste.

In cooperation with Quality Liquid Feeds (QLF), Louisiana State University Hill Farm Research Station recently conducted two studies evaluating the effects of treating poor- to medium- quality large round bales with a liquid-protein supplement on hay waste and dry matter intake.

Study 1.

One hundred sixty nonlactating Angus cross and Hereford-Brahman cross beef cows (BW = 616 ± 73kg, BCS = 5.7 ± 0.7, age = 7.5 ± 3 yr of age) in the second or third trimester of gestation were used to evaluate 3 methods of feeding a liquid-protein supplement with low- to medium- quality hay. All cows were randomly assigned to 1 of 3 treatments for 52d of supplemental feeding. Treatments included QLF DFS 35 liquid protein supplement provided free choice in a lick tank (TNK) and QLF DFS 35 poured onto round bales at 10% of bale weight (POR10) or 15% of bale weight (POR15).

Table 1. Effect of liquid-protein supplementation method on hay waste and hay DMI

	Treatment[1]			*P*-value	
Item	**TNK**	**POR10**	**POR15**	**SE[2]**	**Treatment**
Animals, n	60	60	60	--	--
Initial bale wt, kg of DM	587	572	560	--	--
Hay waste, kg of DM	180[b]	150[a]	132[a]	13.75	0.006
Hay waste, % of bale wt	31.7[a]	26.8[b]	23.9[b]	1.95	0.008
Hay intakes, kg of DM	8.78	9.78	9.18	0.41	0.236

[a,b]Means among treatments within a row lacking common superscript letters differ ($P < 0.05$).
[1]TNK = liquid protein provided free choice via lick tank; POR10 and POR15 = liquid protein poured onto bales at 10 and 15%, respectively.
[2]SE = average SE for the 3 treatment estimates.
Table adapted from Walker et al., 2013

There was a treatment effect for the amount of hay waste ($P = 0.006$), where TNK supplemental cows had greater waste (180 kg/bale) compared with POR15 (132 kg/bale) and POR 10 (150 kg/bale) (Table 1). In addition, there was a treatment effect for percentage of hay waste ($P < 0.010$), where TNK supplemented cows had greater percent of hay waste (31.7%) compared with POR15 (23.9%) and POR10 (26.8%) treatment group, respectively.

Study 2.
One hundred ninety one nonlactating Angus cross beef cows (BW = 532 ± 73kg, BCS = 4.8 ± 0.7, age = 6.4 ± 2.9 yr of age) in the second or third trimester of gestation were used to evaluate 3 methods of feeding a 35% CP liquid supplement with low- to medium- quality hay. All cows were randomly assigned to 1 of 3 treatments for 77d of supplemental feeding. Treatments included QLF DFS 35 provided free choice in a lick tank (TNK) and QLF DFS 35 poured onto round bales at 10% of bale weight (POR) or dried distillers grains plus solubles (DDGS) fed in a bunk daily at 1.25 kg/d per cow as fed.

Table 2. Effect of protein supplementation method on hay waste and hay DMI

	Treatment[1]			*P*-value	
Item	**TNK**	**POR**	**DDGS**	**SE[2]**	**Treatment**
Animals, n	64	63	64	--	--
Initial bale wt, kg of DM	416	412	404	--	--
Hay waste, kg of DM	97.7[a]	74.7[b]	83.5[ab]	7.50	0.100
Hay waste, % of bale wt	23.5[a]	18.3[b]	21.6[b]	1.56	0.084
Hay intakes, kg of DM	9.9	9.9	9.0	0.49	0.325

[a,b]Means among treatments within a row lacking common superscript letters differ ($P < 0.05$).
[1]TNK = liquid protein provided free choice via lick tank; POR = liquid protein poured onto bales at 10% bale weight; DDGS = 1.25 kg/cow of dried distillers grains fed daily.
[2]SE = average SE for the 3 treatment estimates.
Table adapted from Walker et al., 2013

The amount and percentage of hay waste and DMI are reported in Table 2. There tended to be differences in the amount ($P = 0.100$) and percentage ($P = 0.084$) of hay waste by treatment. Cows receiving the POR had 23 kg less waste per bale, resulting in a 5.2% difference over TNK treatment. Although not statistically different, POR did numerically reduce hay waste 8.8 kg per bale compared to DDG treatment. There were no treatment effects ($P = 0.325$) for hay DMI.

As demonstrated by this research, liquid protein supplementation applied to poor- to moderate- quality forages can increase palatability and reduce forage waste. Intake and digestion of forages are limited by the rate at which rumen microbes can break down feedstuffs. Typically, forages do not contain enough available degradable protein sources or soluble carbohydrates for optimal microbial growth. QLF liquid supplements applied to low-quality forages deliver a source of rumen-degradable protein and sugar, providing supplemental energy for fiber digesting bacteria to enhance rumen efficiencies for further breakdown of available forages to sustain desired production.

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