



# Cow Calf Technical Bulletin

## Ruminant Nutrition Overview

Ruminant nutrition is a complex process, and cannot be accurately represented by simple addition of values calculated from a lab report. Supplemental feeds need to be evaluated on their impact on the net nutritional yield of the total diet. In many cases, their influence on total dry matter intake and fiber digestion can have as much – or more – of an effect on their direct contribution of energy, protein, or other nutrients.

Some years ago Oklahoma State University published a set of general rules of the thumb for estimating intakes of typical beef cow diets. Based on information from several research trials, they are still useful and informative guidelines. In the case of pregnant, non-lactating cows, expected intake of low-quality forages would be:

- Unsupplemented, 1.5% of body weight
- Protein supplemented, 1.8% of body weight
- Energy supplemented, 1.5% of body weight
- > 5 lb/day of energy supplement, 1.5% of body weight minus 0.6 lb for each lb of supplement

Digestibility, which basically determines how much useable energy is released from what is eaten, is not a static value for a given feedstuff, especially for ruminant animals. The balance of available nutrients, the number and composition of rumen microbes, and ruminal conditions such as pH all help determine how thoroughly a feed is broken down, and how much good can be gotten out of it. Broadly

speaking, when diets are based on low-to mid-quality hay, crop residues or dormant grass:

- Supplementation to meet ruminal requirements for protein increases fiber digestion. (Research shows improvements ranging from 5 to 20%);
- Moderate levels of starch supplementation lead to a shift in rumen bacterial species and conditions, causing a drop in fiber digestion (This reduction has ranged from 5 to nearly 50% in published research, but often in the 10-15% range);
- Molasses and sugars have been shown to improve fiber digestion;
- When fat content of the diet exceeds 5%, fiber digestion suffers (research indicates puts this depression at 5-10%)

The need to consider this information while making supplement purchase decisions becomes apparent when we actually calculate the net result of various feeding scenarios. The following tables demonstrate the expected intake and digestibility of forage with different supplementation options. Adjustments are based on the more conservative values from the research cited above. The numbers that matter to the cow, and to us, are the final column – the expected total energy supply available to for support of maintenance and pregnancy.

## Expected intake and digestibility of forage with different supplementation options.

1300 lb cows, pregnant and non-lactating, corn stalk diet							
Feeding Program	Suppl. DM%	Suppl. NEm, Mcal/lb DM	Stalks Intake, lb DM/day	Stalks NEm Mcal/lb DM	NEm from Stalks	NEm from Suppl.	Daily Supply NEm
Corn Stalks Only	--	--	19.5	.45	8.78	--	8.78
Stalks + 2 lb 20% cubes	90	.85	19.5	.45	8.78	1.53	10.31
Stalks + 5 lb grain	89	.90	16.5	.40	6.60	4.05	10.65
Stalks + 5 lb 10% fat	48	1.3	16.5	.42	6.93	3.12	10.05
Stalks + 2 lb QLF 40	62	.76	23.4	.47	11.0	.94	11.94

1150 lb cows, pregnant and non-lactating, 7% protein hay diet							
Feeding Program	Suppl. DM%	Suppl. NEm, Mcal/lb DM	Hay Intake, lb DM/day	Hay NEm Mcal/lb DM	NEm from Hay	NEm from Suppl.	Daily Supply NEm
Hay Only	--	--	17.25	.48	8.28	--	8.28
Hay + 2 lb Soy Hulls	91	.84	17.25	.48	8.28	1.53	9.81
Hay + 5 lb grain	89	.90	14.25	.43	6.13	4.00	10.13
Hay + 5 lb 10% fat	48	1.3	14.25	.45	6.41	3.12	9.53
Hay + 2 lb QLF 32	67	.85	19.80	.50	9.90	1.14	11.04

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