

Precision Counts in Feed Supplementation

Evaluating options for specific needs can save lots of money.

by **Mark Z. Johnson, Ph.D.**

From a nutritional standpoint, cattle basically need protein, energy, vitamins, minerals and water. Assuming free-choice vitamin/mineral and water is in adequate supply, most nutritional supplementation and feeding focuses primarily on the crude protein (CP) and energy (TDN) needs of cattle. Keep in mind nutritional needs of cattle vary by age, size, stage of production, environmental conditions and weather, gender, breed and other factors, such as the level of milk production.

It is imperative to determine a feeding or supplementing objective. Are we trying to grow lightweight calves in a dry lot until wheat pasture is available? Are we maintaining the condition on pregnant cows until calving season or do cows need to gain some condition before calving season? What size are our cows? What is the nutritional content of the standing forage or hay we have on hand? These are just some of the answers needed to determine the goal of our nutritional program. After answering those questions and defining our goal, we can minimize input costs and maximize our profit potential by evaluating feeds based on nutrient content as opposed to just looking at the price per ton or bag.

Evaluating feeds on a cost per unit of protein and energy basis

At the time of writing, 38% CP, 70% TDN range cubes were available at a bulk price of \$475/ton. The same commercial feed mill had 20% CP, 70% TDN cubes priced at \$350 per ton.

Protein and energy content are on an “as fed” basis. If we are in a situation requiring protein supplementation of cows grazing warm season grass this fall, either of these protein supplements could meet our needs, but which is the more cost-effective alternative? At first glance, \$350 per ton strikes most of us as a more cost-effective feed. But what are we actually getting? Some “cowboy math” yields answers.

“The goal of supplementation is to feed just enough of the right supplement to optimize the overall diet.”

— **Mark Z. Johnson,**
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38% cubes — At a cost of \$475, one ton of 38% cubes contains 760 pounds of CP and 1,400 pounds of TDN (2,000 pounds x 0.38 = 760 pounds and 2,000 x 0.70 = 1,400 pounds)

The cost per unit of CP is \$0.625 per pound and the cost per unit of TDN is \$0.34 per pound (\$475/760 pounds = \$0.625 and \$475/1,400 pounds = \$0.34).

20% cubes — At a cost of \$350, one ton of 20% cubes contains 400 pounds of CP and 1,400 pounds of TDN (2,000 pounds x 0.20 = 400 pounds and 2,000 x .070 = 1,400 pounds)

The cost per unit of CP is \$0.875 per pound and the cost per unit of TDN is \$0.25 per pound (\$350/400 = \$0.875 and \$350/1400 = \$0.25).

So, the more cost-effective source of CP is 38% cubes, and the more cost-effective source of energy (TDN) is the 20% cubes.

Ultimately, the most cost-effective feed depends on our objective: Why are we feeding/supplementing? Again, many factors impact the nutrient requirements of cattle.

Evaluate and compare supplement cost

The following illustrates evaluation of purchased feed alternatives on a cost of nutrient basis, relative to a defined goal. Specifically, this example considers supplement cost of purchased feed per unit of protein and energy.

We have 60 mature cows with an average weight of 1,300 pounds. They are entering the last trimester of pregnancy — due to calve in January — with a body condition score (BCS) of 5.5. We have ample standing forage in the form of native grasses, which forage analysis indicates is 5% CP and 55% TDN. On grass of this type, cows should consume 1.9–2.0% of their body weight, which results in forage dry matter (DM) consumption of 25 pounds per day. Knowing that reproductive efficiency is highly correlated to nutrition, our objective is for cows to maintain current weight and BCS until calving.

These cows will need 1.84 pounds of CP and 13.3 pounds of TDN per day over the next 100 days.

If possible, we would like to maintain cows by utilizing the standing forage. Can this be done?

Source:

Beef Cattle Manual, Eighth Edition, E-913. Oklahoma Cooperative Extension. Chapters 16 and 17.

Twenty-five pounds of forage DM intake x 0.05 CP = 1.25 pounds per day CP intake. This leaves a CP deficiency of 0.59 pounds per day (required CP of 1.84 pounds per day – 1.25 pounds per day CP from forage consumption = 0.59 pounds per day).

On the other hand, there is no energy deficiency, as the forage provides 13.75 pounds of TDN per day (25 pounds forage DM intake x 0.55 TDN = 13.75 pounds per day TDN intake).

So, there is a supplemental need for protein. Research has consistently shown that protein supplementation is extremely effective for cattle grazing protein-deficient forage. In fact, energy supplementation will not be effective if dietary protein is deficient.

Which of the two protein supplements evaluated earlier can meet our goal most cost-effectively, the 20% CP range cubes at \$350/ton or the 38% range cubes at \$475/ton?

It would take 3 pounds/day of the 20% cubes to meet the CP requirement (0.59 pounds CP deficiency/0.20 CP content = 3

pounds). Previously, we determined the cost per unit of CP in the 20% range cubes to be \$0.875 per pound. That means the cost to account for the CP deficiency in this scenario is \$0.52 per day (0.59 pound CP deficiency x \$0.875 = \$0.52 per day). The total cost for supplementation with the 20% cubes is \$3,120 (daily cost of \$0.52 x 100 days of supplementation x 60 cows = \$3,120).

In comparison, 1.58 pounds per day of the 38% cubes is needed to meet the CP requirement (0.59 CP deficiency/0.38 CP content = 1.58). Previously, we calculated the cost per unit of CP in the 38% range cubes to be \$0.625 per pound. That means the cost to account for the CP deficiency in this scenario is \$0.37 per day (0.59 pound CP deficiency x \$0.625 = \$0.37 per day). The total cost for supplementation with 38% cubes is \$2,220 (daily cost of \$0.37 x 100 days of supplementation x 60 cows equals = \$2,220).

So, supplementing with the 38% range cubes purchased at a cost of

\$475 per ton results in a savings of approximately \$900, compared to using the 20% cubes at a cost of \$350 per ton in this scenario.

Unnecessary supplementation increases feed cost without real benefit. The goal of supplementation is to feed just enough of the right supplement to optimize the overall diet. Determining the most cost-effective means of supplementing cows requires the evaluation of feeds on a cost per unit of protein and energy provided. As illustrated by the example above, you cannot afford to ignore this evaluation.

Computer software, such as the OSU Cowculator program, can better pinpoint an animal's nutrient requirement at a specific time and in a specific stage of production. These and other useful tools can be found at beefextension.com. **BA**

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