Meeting the Protein Needs of Growing and Finishing Cattle

William W. Schneider
South Dakota State University
Meeting the Protein Needs of Growing and Finishing Cattle

William W. Schneider

The cost of nearly all feed commodities has sharply risen since one year ago. Those feed ingredients normally used as natural protein sources, however, have risen in cost much more dramatically than the roughages or the cereal grains used for animal feed. This substantial rise in cost of high protein feeds plus possible shortages of feed grade urea will force many cattle feeders to alter feeding and management practices used in the past. For example, recommendations in previous years frequently called for the use of soybean meal or soybean meal based supplements as the source of protein in growing rations. These recommendations were based on experimental work that had shown that urea or other nonprotein nitrogen sources were not utilized as well in high roughage rations (such as those commonly used in growing programs) as was natural protein. The current price differential between all natural protein supplements and those containing nonprotein nitrogen is considerably greater than it has been in the past. Therefore, economics dictate the use of supplements containing substantial quantities of nonprotein nitrogen in growing as well as finishing rations.

With the high cost of protein and the possibility of a shortage of feed grade urea no one can afford to over feed protein. An inexpensive protein analysis of feedstuffs can sometimes prevent over feeding. Frequently, feedstuffs protein content varies from book values (book values are simply an average of many samples). Whether the actual protein analysis of a feedstuff is higher or lower than book value, it is important that the feeder has this information available if he is to formulate an efficient ration.

Often times when feed grains and forages are grown on ground which has been fertilized with high levels of nitrogen, they contain levels of protein higher than book values. If the feeder is made aware of such higher protein values by having feedstuffs analyzed, he may reduce protein supplementation needs considerably.

In the case of feeders who feed complete mixed rations formulated on a percentage basis, moisture analysis should also be made. Underestimating moisture content of percentage rations will result in feeding a higher percentage of protein supplement than was desired. Both protein and moisture analyses are relatively inexpensive. There are several independent laboratories, as well as South Dakota State University Experiment Station Biochemistry Laboratory, which are equipped to make such analyses.

After a producer has determined what his protein needs are, supplements should be purchased to fit his particular program. Most supplements are not only formulated to contain a specified level of protein but also other feed additives. Frequently, feeders will feed levels of these supplements to assure adequate levels of antibiotics, vitamins and minerals. This often times results in over feeding of protein. Most manufacturers have a number of supplement formulas. Therefore, careful shopping following feed analysis and ration formulation will usually result in the finding of a supplement that will meet protein needs and contain proper levels of other feed additives as well.

Frequently, feeders will change forages or grains during a feeding period. Protein supplementation should be reconsidered when such changes are made. For example, if alfalfa haylage is used to replace sorghum silage, protein supplement needs may be reduced considerably.

Perhaps the greatest reduction in supplementation costs can be made by proper management of locally grown feedstuffs which are moderately high in protein. South Dakota producers in many instances have access to alfalfa, oats and barley. These feedstuffs can be incorporated into growing rations to provide much of the animal's protein requirement. In growing rations such feedstuffs (alfalfa, oats and barley) would provide natural protein much cheaper than commercial sources. A logical course of action for a farmer-feeder, who finished as well as backgrounded cattle, would be to utilize higher protein, home-grown feeds in the backgrounding stage. Lower protein grain (such as corn) and lower quality roughage could be used in the finishing phase with nonprotein nitrogen supplementation. Cattle fed high concentrate finishing rations have been shown to utilize nonprotein nitrogen nearly as effectively as natural protein. Utilization of nonprotein nitrogen in lower concentrate rations, however, is not as effective.

The difference in nonprotein nitrogen utilization in these two types of rations is due to the difference in the amounts of readily available energy. Microorganisms in the rumen break down nonprotein nitrogen compounds and ammonia is liberated. If energy is readily available when the ammonia is released (and it is in typical finishing rations), bacteria will utilize the ammonia to synthesize bacterial protein which is, in turn, digested in the lower tract of the animal. In the case of growing rations which usually contain substantial quantities of roughage, energy is not released as rapidly and therefore high levels of energy are not available to the microorganisms at the same time ammonia is released from urea. Consequently, the nonprotein nitrogen (urea) is not as efficiently utilized as it is in high-concentrate rations.

Hopefully supplies of urea or nonprotein nitrogen will be adequate. If, however, supplies should become limited or unavailable, it would be advisable to reduce or cut out supplemental protein at the end of the finishing period as opposed to earlier in the growing phase. Growing animals' weight gains are mostly muscle and therefore protein needs are more critical. An animal nearing slaughter weight on the other hand is laying down mostly fat. The larger animal is also consuming more total feed daily and therefore is also consuming more total protein than a smaller animal eating a ration containing the same percent protein. Recent results in Ohio have shown that steers fed finishing rations with no supplemental protein after the first 56 days on feed performed quite satisfactorily. These
tests were limited in number and therefore no recommendations can be based on them yet. These tests do, however, lend support to the idea of limiting protein at the end of the finishing period if you must limit it at all.

A summarization of ways feeders might most effectively utilize high protein feedstuffs and reduce supplemental protein costs is as follows:

1. Have protein analysis run on feedstuffs to determine actual protein supplement needs.

2. Buy or have supplements formulated to fit specific needs. Don't over feed protein just to insure adequacy of other additives. Buy protein supplement separate from other feeds if necessary.

3. Get maximum utilization from natural protein in local feedstuffs. Use higher protein forages and grains in growing phase if practical. Lower cost nonprotein nitrogen supplements are better utilized with finishing rations.

4. If energy sources of ration are changed, determine if supplement needs to be altered as well.

5. If protein supplements become limited, limit protein supplementation at the end of the finishing period.

As many commercial supplements will contain sizable quantities of urea this year, it should be pointed out the management will become more critical. Over consumption of nonprotein nitrogen (urea) can cause toxicity and sometimes death. If high urea feeds are to be utilized, several precautions should be exercised:

1. It is recommended that supplements containing nonprotein nitrogen be introduced gradually over a period of 1 to 2 weeks and not until after a period of 4 weeks for calves following weaning.

2. Supplements should be mixed thoroughly in mixed rations or be fed in a manner so as to avoid over consumption and subsequent toxicity.