

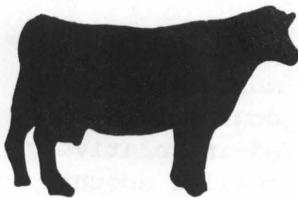
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dairy guidelines

EXTENSION DIVISION

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

BLACKSBURG, VIRGINIA



Series 130 - August 1979



ARE LIQUID PROTEIN SUPPLEMENTS FOR YOU? V.P.I. & S.U. DAIRY

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SEP - 5 1979

BLACKSBURG, VIRGINIA

SUMMARY

A liquid protein supplement is a source of nonprotein nitrogen in a liquid carrier. Bacteria convert the nonprotein nitrogen to ammonia which is incorporated into bacterial protein and eventually digested by the cow. The ammonia from liquid protein supplements is not efficiently used unless the animal consumes only small amounts at any one time or unless the ration is deficient in protein content. It appears that liquid protein supplements do not provide any economic advantage. The use of liquid supplements may be practical under special conditions.

Liquid Protein Supplements (LPS)

A liquid protein feed supplement for dairy cattle consists of protein in a liquid vehicle plus at least one additive. Most liquid protein supplements use molasses as the diluent, although it is possible to use fermentation liquors, distillers solubles, etc. Molasses is a readily available energy source which is essential for utilization of nonprotein nitrogen (NPN). The most common NPN additive is generally urea, but other forms of ammonium can be used. The second most common additive is phosphorus, provided by phosphoric acid. The source of phosphorus can affect viscosity and pH (acidity) of the liquid supplement. The acidity will influence free-choice consumption of liquid supplements. Phosphoric acid is readily available as a source of phosphorus and helps to stabilize the nitrogen.

Utilization of NPN

Protein is broken down by rumen bacteria to ammonia. A certain amount of this ammonia can be utilized by most bacteria. The ammonia is used to form amino acids which become a part of the bacteria's protein structure. In the lower digestive tract, the cow is capable of digesting this microbial protein and making use of the amino acids.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, and September 30, 1977, in cooperation with the U. S. Department of Agriculture. W. R. Van Dresser, Dean, Extension Division, Cooperative Extension Service, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061; M. C. Harding, Sr., Administrator, 1890 Extension Program, Virginia State University, Petersburg, Virginia 23803.

Bacteria can utilize the ammonia only at a certain rate. If the rate of ammonia release is too rapid or if excessive protein is consumed, ammonia accumulates in the rumen and much of it is excreted.

Rumen bacteria also can break down natural plant proteins (oil meals, brewers grains, etc.) to ammonia, but the ammonia from LPS is released more rapidly, therefore causing excessive losses if large amounts of LPS are consumed in a short period of time. Liquid protein supplements should be fed in relatively small quantities, several times during the day. Consequently, smaller amounts of ammonia will be released in the rumen, and conversion to microbial protein will be more efficient.

Feeding the Milking Herd

1. Cattle do not use NPN efficiently when the total ration dry matter contains more than 13% crude protein, according to Wisconsin research. Virginia Tech research indicates that it is difficult to justify inclusion of NPN in the ration, regardless of price relationships, especially for high producing cows who require more than 13% crude protein in the total ration dry matter.
2. Inclusion of LPS in the ration does not appear to be as profitable as the use of natural protein sources. The Virginia Tech Dairy Cattle Feed Formulation System considers feed prices and requirements for soluble and insoluble protein, energy, crude and effective fiber, and certain minerals. With corn silage as the major forage, and using current prices, this feeding management system did not select liquid protein supplement because the LPS supplied an excessive amount of soluble protein, and because natural protein sources provided more economical sources of metabolizable protein.
3. When corn silage is the major forage, low producing cows--as well as dry cows, yearlings, and older heifers--may benefit from LPS. If these animals are on good pasture, extra energy supplementation may be necessary, but usually protein is adequate. When pastures are short and dry, or when low protein hays are fed, then LPS along with a source of energy (e.g., corn, barley, milo) may be used. The LPS is generally provided in a self-feeding tank. Cows consume about 2-3 lb per day. However, if a grain mix must be fed to these animals, it may be more economical to use an oil meal protein rather than LPS.