



BIOBASE™ RUMEN

Product Information Sheet

BIOBASE™ RUMEN is a liquid feed additive derived from microbial fermentation that provides a growth stimulus to microbial populations present in the digestive tract of ruminants. When feeding ruminants for meat and milk production, the more feed the animal will eat and digest the more meat and milk will be produced. Or to put it another way, the faster the ruminant can eat and digest a given amount of feed the sooner it will be back to eat some more.

Digestibility refers to those nutrients which are broken down by microflora, or are solubilized by some digestive enzyme and are absorbed through the lining of the gut into the blood and body fluids of the animal. Therefore, the term digestibility, as used here, implies both digestion and absorption of the feed.

Digestibility of feeds is variable and affects how well a feed will be utilized by the animal. As most minerals are ingested by the animal, a certain portion will be absorbed in the digestive system and the remaining portion will remain unabsorbed. Of the absorbed portion, some will be incorporated into the tissue and bones of the animal, some will be released from various tissues and excreted into the intestine and eliminated along with the unabsorbed minerals in the feces and urine. Actually a fairly high percentage of the mineral content may have been solubilized and digested by the animal, and performed various functions within the body of the animal before being excreted. Therefore, the measuring of digestibility of the mineral content only as that amount of intake not recovered in the feces would not be accurate. Instead, mineral balances are carried out in which all of the intake and output are measured to determine what balance is retained in the body of the animal.

Efficient feed conversion as well as high levels of production are both characteristic of advanced feed rations. As science has increased the knowledge base concerning nutrient requirements of commercial stocks as well as the nutrient content of feed ingredients, feed rations have been developed that provide needed nutrients at the lowest cost.

Ruminants are managed under a variety of conditions to best utilize the feed resources available under existing environmental factors. This variation presents a challenge in applying nutrient requirements. Since the ruminant can utilize a wide array of feed sources, production levels to optimize economic return vary. Hence, it may not be economical to feed ruminants to meet the nutrient requirements under all production systems.

Additional sources of energy are generally the first consideration in determining a balanced



ration for ruminants. Until the energy requirement is satisfied, protein, minerals and vitamins may not be well utilized. The amount of energy required for different production levels will also vary. Because ruminants use fiber as a major source of energy, the quantity of forage or feed and the quality are important. When energy is limited, supplemental protein will be used for energy until the energy needs are met; then the remaining protein will be used to meet the protein needs.¹

The proprietary two stage fermentation process used in **BIOBASE™ RUMEN** provides a microbial growth medium consisting of amino acids, peptides, enzymes, co-enzymes and growth factors necessary for optimum growth and activity of microorganisms. Thus **BIOBASE™ RUMEN** stimulates beneficial gastrointestinal microorganisms thereby improving the digestion and conversion of feed to weight gain by the ruminant. In addition, **BIOBASE™ RUMEN** is blended with proteinated and chelated trace minerals essential for microbial growth and in a form readily absorbed through the intestinal wall of the animal. Enzymes derived from controlled fermentation processes make available exogenous sources that are cost effective and able to hydrolyze fibre or non-starch polysaccharide fractions, such as those found in cereal grains. The exposure of feed grain to changing pH and digestive enzymes during passage through the digestive tract may alter both the quantity and characteristics of the soluble fractions. Thus, simple measurements of the soluble content of grains will not provide accurate predictions of their nutritive value as a feed ration component. Enzymes capable of hydrolyzing grain cell walls are found in a wide range of microbial sources.

BIOBASE™ RUMEN may be used in virtually any conventionalized stock management system. Fed continuously during the weaning, growing and finished phases, improved feed efficiency and growth will be observed. **BIOBASE™ RUMEN** can be added directly to the growing and finishing diets through vitamin-mineral pre-mixes or supplements. The stimulus of the beneficial gastrointestinal micro-organisms improves the digestion of feed within the rumen thereby improving the conversion of feed to weight gain.

The presence of billions of micro-organisms in the digestive tract of the ruminant are necessary to promote the digestion of feed so necessary nutrients can be readily absorbed by the digestive system of the animal. These materials then become a necessary part of the metabolic process for activity, growth reproduction and disease resistance. **BIOBASE™ RUMEN** provides necessary amino acids, peptides, enzymes, co-enzymes and other essential growth factors which improve both the microbial environment and stimulate the growth and activity of beneficial microorganisms in the digestive tract of the animal enabling it to more fully complete feed digestion into essential nutrients that can easily be

¹ Clanton, D.C., and D.R. Zimmerman. 1970. Symposium on Pasture Methods for Maximum Production in Beef Cattle: Protein and Energy Requirement for Female Beef Cattle. Journal of Animal Science 30:122.



assimilated through the wall of the intestinal tract.

The rumen does not become functional until 6-8 weeks of age, depending on diet. The pre-ruminant animal nutrition parallels that for the non-ruminant. After the ruminant becomes functional the accrued protein needs for two systems must be met, i.e., the need for nitrogen for microbial fermentation in the reticulo-rumen and the need for post-ruminal amino acids for tissues of the host ruminant.

About 75% of the carbohydrates digested by ruminants is fermented by microbes in the rumen. During the fermentation, volatile fatty acids, ammonia, methane and CO₂ are released and energy is liberated from microbial growth and multiplication. A wide variety of microbial types thrive in the rumen. Swept out of the rumen to the abomasum and small intestine with fluid particles, these microbes typically furnish about half of the protein (amino acids) needed by the ruminant animal. Ruminant bacteria can use various sources of nitrogen (primarily ammonia and some amino acids and peptides), energy (derived from fermentation), and minerals for growth. Any of these factors can limit bacterial growth since requirements are interrelated. A supply of ammonia can be inadequate when either the intake of protein or the ruminal degradation of protein is low. Ammonia deficiency in the ruminant reduces the efficiency of bacterial growth and may reduce the rate and extent of digestion of organic matter in the rumen, which may reduce feed intake.

Dietary protein is digested in the rumen to a variable degree depending on feed, bacterial, animal and time conditions in addition to chemical and physical properties characteristic of the protein. The balance of the dietary protein that escapes destruction in the rumen and passes to the omasum and abomasum was commonly co-bypassed or escape protein. Protein thus escaping ruminal destruction is either digested post-ruminally or secreted in the feces. Microbial variables can markedly alter by-pass or escape protein by modifying (1) ruminal retention time for digestion and (2) microbial activity within the rumen. The focus of BIOBASE RUMEN is on increasing microbial activity within the rumen. Although the post-ruminal need for protein is not fully quantified, it is known to be important. When high by-pass protein is fed, increased animal production is not automatically assured, however, since (1) the by-pass protein may be poorly digested in the small intestine, (2) the balance of amino acids in post-ruminal protein may be poor, or (3) energy supply or nutrients other than amino acids may be limiting animal production.

A supply of protein to the small intestine is the sum of the fed protein that escapes or bypasses ruminal destruction and microbial protein synthesized within the rumen. Efficiency of microbial growth varies with specific culture conditions, such as pH, dilution rate, and limiting nutrients. Microbial protein synthesis is usually correlated with the amount of organic matter digested in the reticulo-rumen.

Another important factor in nutrient availability is intestinal viscosity. Although the exact effects of viscosity have not been established, possible mechanisms include reduced rates



of diffusion of endogenous enzymes and nutritional substrates. As the viscosity of a solution increases, the rate of nutrient diffusion decreases and there is a compounding reduction in nutrient assimilation. In fact, the larger the molecule in question, the greater the impact of increasing digestive viscosity on its rate of diffusion. Whether viscosity is the direct cause of reduced nutrient assimilation or merely a result or indicator of other anti-nutritional activities present has not been determined.

MINERALS

The following minerals are known to be important in ruminant feed rations:

Calcium	Cobalt
Copper	Iodine
Iron	Magnesium
Manganese	Molybdenum
Phosphorous	Potassium
Selenium	Sodium
Chlorine	Sulfur
Zinc	

Other than for common salt, animals apparently do not have the ability to select needed minerals.

VITAMINS

Ruminants have physiological requirements for most vitamins required by other mammals. Synthesis by microorganisms in the rumen supplies the natural feed stuffs, and synthesis in the tissues meets most of the usual requirements. The ability to synthesize B vitamins and vitamin K in the ruminant develops rapidly when solid feed is introduced into the diet. Vitamin D is synthesized by animals exposed to the direct sunlight and is found in large amounts in sun-cared forages.

The water requirement in ruminants is influenced by several factors, including rate and composition of gain, pregnancy, lactation, activity, type of diet, feed intake and environmental temperature. A restriction of water intake reduces feed intake, which results in lower production.²

HOW DOES BIOBASE RUMEN WORK

² Uttley, P.R., Bradley, R.W. and Boling, J.A. 1970. Effective Restricting Water Intake on Feed Intake, Nutrient Digestibility in Nitrogen Metabolism in Steers. General Animal Science 31:130.



The presence of billions of micro-organisms in the digestive tract of the ruminant are necessary to promote the digestion of feed into end products that can be readily absorbed by the digestive system of the animal. These materials become a necessary part in the metabolic processes of activity, growth, reproduction and disease resistance. **BIOBASE™ RUMEN** provides necessary amino acids, peptides, enzymes, co-enzymes and other essential growth factors which improve the microbial environment and stimulate the growth and activity of beneficial micro-organisms in the digestive tract of the animal enabling it to more fully complete the digestion of feed into essential nutrients that can be easily assimilated through the wall of the intestinal tract.

The inclusion of **BIOBASE™ RUMEN** in feed formulations will enhance the growth and activity of beneficial gastrointestinal micro-organisms and stimulate an increase in feed efficiency and weight gain in ruminants. The addition of **BIOBASE™ RUMEN** will also improve feed digestion and efficiency of the breeding herd. It is recommended that **BIOBASE™ RUMEN** be fed continuously to ruminants during breeding, gestation and lactation. This practice will improve the overall thriftiness of the breeding herd and will give newborn animals a healthy start. The proteinated and chelated trace minerals present in **BIOBASE™ RUMEN** are highly bioavailable and are formulated to enhance growth and reproductive functions in ruminants. Daily use is recommended for maximum results.

BIOBASE™ RUMEN improves the profitability of the animal operation by increasing the dollar return. This improvement in profitability is realized through (1) healthier and more efficient animals; (2) animals tend to finish in less time as a result of the faster growth; (3) less feed is required per animal from weaning to finish; (4) carcass gain has a higher lean content resulting from improved protein digestion and absorption; (5) there is a general improvement in animal health from improved nutrient utilization and reduction in stress caused from improper nutrient balances; (6) animals also tend to recover faster from disease conditions when nutrient balances are optimized, therefore morbidity and mortality are generally reduced.

Rumen feed rations supplemented with **BIOBASE™ RUMEN** have shown the following beneficial effects:

- Decreased mortality
- Lower incidence of diarrhea
- Earlier weaning
- Increased feed efficiency
- Increased production of volatile fatty acids essential to the animal's fermentation process
- Increased weight gain, growth and milk

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system. Fed continuously during the weaning, growing and finishing phases it will improve feed efficiency and growth. **BIOBASE™ RUMEN** can be added directly to growing and finishing diets through vitamin-mineral premixes or supplements.

GUARANTEED ANALYSIS

Stablized liquid <i>L. acidophilus</i> and <i>P. freudenreichii</i> fermentation product	52%
Manganese (Mn)	.12%
Copper (Cu)	.25%
Zinc (Zn)	.22%
Iron (Fe)	.70%

APPLICATION RATES

Apply at the rate of 3-6 ml/head/day (1-8 weeks 3 ml; 8 weeks to 400 lbs. 4 ml; greater than 400 lbs. 6 ml/day). May be mixed in feed, or applied in drinking water or as a drench. In hand feeding, spray on each animals feed. If a drench, mix with water and drench into the mouth. In drinking water mix or inject into water under agitation.

To calculate the amount of **BIOBASE™ RUMEN**/batch of feed divide the number of head by 10 and multiply by the number of days the batch of feed will last. Alternatively, apply to feed ration at the rate of 495 ml/MT (15 oz./ton) of feed. Mix enough water with **BIOBASE™ RUMEN** to provide even coverage and thoroughly mix with ration. When grinding and mixing in grain ration, spray the solution on the protein supplement when it is added to the mixer or after the protein is in the mixer but before any grain is added. When applying to silage, hay or other roughage, spray over the top of the hay or silage in the bunk **BIOBASE™ RUMEN** may be mixed or injected into drinking water with proper agitation.

Most of the information on nutrient requirements of rumen came from, *Nutrient Requirements of Beef Cattle*, Sixty revised edition, 1984, Subcommittee on Beef Cattle Nutrition Committed on Animal Nutrition. National Research Committee. National Academy Press, Washington, D.C. 1984.