
Browsing Academy

NUTRITION OF THE GOAT



The goat is classified as a ruminant because of the four compartments comprising its' digestive system.

- Reticulum - (5% total volume)
- Serves as a water reservoir; heavy materials are softened and broken apart.
- Rumen - (80% total volume)
- A storage site with fermentation and digestion of cellulose by microflora and some absorption occurring.
- Omasum - (7% total volume)
- Water absorption and finer pulverizing of feed particles.
- Abomasum - (8% of total volume in an adult; 70% of total volume in the kid)
Enzymatic breakdown of feed particles.

The small intestine plays an integral part in absorption from gastric digestion of proteins (amino acids), carbohydrates (sugars and starches), fats (lipids), vitamins and minerals. The large intestine absorbs water, and some minerals (potassium, phosphorus, magnesium) and synthesizes vitamin B (thiamin), B2 (riboflavin), B12 (cyanocobalamin) and K.

The need of nutrients to meet various uses determined by:

- Maintenance - body temperature, internal functions, movement, repair of body tissue, weight gain or loss
 - Energy is needed the most for maintenance.
- Growth - increase body measurement and weight
 - body functions (lactation, fiber, meat)
 - Protein and macro minerals are needed the most for growth.
- Activity - walking and perspiration, warming
- Reproduction - gestation especially the last trimester
- Lactation - water
 - stress on mammary and blood systems
 - feed for lactation requirement
- Finishing - (meat production)
 - need high energy:protein ratio with high level of intake
 - all other body requirements are met first

Requirements of the nutrients vary depending upon:

- Age, sex and breed of goat
- Quality of diet on offer (vegetation, supplement)
- Environment – (climate, rainfall distribution and amount, temperature)
- Heredity and Disease and Physiological status (maintenance, growth, lactation, gestation)
- Activity and exercise (walking to graze and browse), altitude and topography
- Degree of body condition, ability to use body reserves and body weight of the goat

The six basic nutrients are:

WATER - THE MOST IMPORTANT - FRESH, CLEAN, ALWAYS AVAILABLE!!!

There are many factors affecting the water requirement of goats including level of dry matter intake, physical form of the diet, physiological state of the animal (gestation, lactation, finishing, etc.), temperature of the water, ambient temperature, frequency of drinking, activity of the animal and the time of day. Goats require approximately 1 to 3 gallons of water per day and drink about 4 times more during the day than the night. If the goat is deprived of water, it will lose 1.5% of its body weight over a 4 day period. Water restriction also causes a decrease in feed intake, decreases productivity, and increases pulse rate, temperature and respiration rate.

Water functions in the animal to transport nutrients, body temperature regulation, lubrication, and chemical reactions within the body. During milk production, a 1:5 dry matter:water ratio is needed.

CARBOHYDRATES

Carbohydrates (sugars and starches are readily digestible; cellulose, hemicellulose, and lignin are poorly digested) make up 3/4 of plant dry weight. They are the largest part of the goats food supply. During gestation, intake of carbohydrates increases by 10% and with lactation, intake goes to 70% over maintenance.

Carbohydrates function in the animal as energy for life processes and rumen micro- flora, heat and as a base for building other nutrients. Cellulose and lignin content is affected with advancing maturity of the forages.

FATS (lipids)

Fats produce approximately 2.25 more time the energy than carbohydrates. In this respect, fats contain more energy per unit of weight. Within the animal body, fats surround internal organs, and appears in milk and meat.

Fats function in the animal as a condensed energy reserve for maintenance and production, provide heat and insulation (not much in the goat as they have minimal subcutaneous fat reserve), aid in the absorption of fat soluble vitamins and provide protection (kidneys).

PROTEIN (amino acids)

Protein is an important organic component of animal tissue. The highest concentration is in muscle tissue. There is a large difference between crude protein (CP), and digestible protein (that portion of crude protein the goat can digest). Amount and type of protein needed vary with maintenance, production (lactation, growth, etc.) and reproduction. They are very important in enzymes, hormones, antibodies, muscle contractions, oxygen transport and blood coagulation. Protein can also be used as energy in the goat. Know the value of the protein available (and the digestibility of dry matter) in the forage the goat is consuming so the correct amount of protein can be supplemented.

MINERALS (inorganic elements)

Minerals are classified as major (macro) - calcium, phosphorus, potassium, sodium and chloride and trace (micro) - iodine, iron, zinc, copper, selenium, etc. Mineral requirements are important in ratios - Ca:P (2:1) and Zn:Cu (4:1). Minerals can be toxic, deficient and unabsorbable. Toxicity margin of safety varies with geographic area or location, diet, mineral interactions and the physiological state of the goat.

Salt content of a free choice mineral mix should not be more than 10% of the mix.

The function of minerals within the body affect skeletal formation and maintenance, cellular activity, oxygen transport, chemical reactions within body tissues, fluid balance, enzyme systems and a mineral/vitamin relationship.

VITAMINS (organic)

Vitamins are essential dietary components, effective in small amounts, with a specific function and necessary for metabolic activity (energy metabolism and protein synthesis). They are classified as water soluble (thiamin, riboflavin, niacin) and fat soluble (A, D, E and K). Vitamins are important in body functions (bone formation, absorption, synthesis). The fat solubles are stored in body tissues and the non-solubles need to be supplied daily.

VITAMIN AND MINERAL IMBALANCES

It is critical that the dietary requirements of vitamins and minerals be supplied in amounts needed by the feed consumed (forage analysis) or supplemented (free choice). Know the signs of dietary deficiencies and excess most prevalent in your geographic area.

METABOLIC DISEASES

- Parturient Hypocalcemia (milk fever)
- Calcium supply decreases as colostrum is twice as high in calcium as is milk.
- Can also be caused by a phosphorus, Vitamin D, calcium imbalance.
- Polioencephalomalacia (PEM)
- Thiamin production is inhibited by bacteria that produce the enzyme thiaminase.
- Calculosis (Urolithiasis)
- Urinary calculi are formed when feeding a high concentrate diet with a mineral imbalance resulting from excessive phosphorus intake.

- Grain Overload (Lactic Acidosis)
- An overload of carbohydrates causes rapid fermentation of starch in the rumen.
- Enterotoxemia (Over-eating Disease)
- A bacteria produces a toxin and the gastro intestinal tract slows down.
- Johne's Disease
- Digestibility and absorption of nutrients (from the wall of the intestines) decreases due to a bacteria.
- Ketosis (Pregnancy Toxemia)
- Under or over nutrition of energy should be controlled during gestation, consumption of roughage needs to be maintained.

POISONOUS PLANTS

Before entering an area to land clean, or just browse goats for daily exercise, have a vegetative plant list established. Goats are bipedal with mobile lips and their established browsing pattern is different than cattle and sheep exposing them to many plant species. As long as goats are not 'forced' to eat plant species, they will tend to select away from poisonous plants until a specific time in the physiological growth cycle of the plant when it has become less toxic.

More than 80% of a goats diet can be browse and they can consume a high percentage of their body weight per day, as high as 11%.

CLASSIFICATION OF FEEDSTUFFS

- Roughages - pasture and range plants, dry forages and roughages (hay)
 - silages (not highly recommended for goats due to listeriosis)
- Concentrates - used primarily for energy
 - cereal grains (whole corn, whole barley), molasses (<1/2 of 1%)
 - animal (avoid at this point in time), marine and vegetable fats
- Protein Concentrates - more than 20% crude protein
 - animal (not advised at this time), plant and marine sources
 - processed milk byproducts
 - legume seeds, dehydrated legume plants
- Mineral Supplements - macro (Ca, P, Na, K, Cl, Mg, S)
 - micro (Zn, Cu - in enzyme systems)
 - factors determining utilization:
 - -interrelationship among minerals
 - -amount of mineral available in the diet
 - -mineral status of the animal
 - -form of mineral and breed requirements
 - -geographics (deficiencies/toxicities)
- Vitamin Supplements - fat soluble (stored) A, D, E, K; water soluble (daily) (B's, C)
 - required in minute amounts; each has a specific function
 - energy metabolism, protein synthesis
- Non-nutritive Additives - antibiotics, antioxidants, buffers
 - electrolytes
 - flavors, xanthophylls, pellet binders
 - coccidiostat