NUTRITIONAL DEFINITIONS

Listed below are nutritional terms and definitions to assist you in interpreting the reports you receive from the laboratory.

ACID-DETERGENT FIBER (ADF) is the portion of fiber that is composed of cellulose and lignin. ADF is related to forage digestibility (energy) and is used to calculate forage total digestible nutrients (TDN) or net energy (NE) for hay, haylage and corn silage. Forages lower in ADF are usually higher in energy.

AS RECEIVED BASIS has results reported on the sample that includes the moisture the sample contained when it arrived at the laboratory.

CRUDE FAT contains fat and other compounds soluble in ether. Fat contains 2.25 times the energy found in carbohydrates and proteins. It is added to rations to boost energy concentration when intake may be limiting.

CRUDE PROTEIN (CP) is determined by measuring the total amount of nitrogen present in the sample and mathematically converting that value to an approximate protein value. Crude protein includes true protein and other nitrogen-containing substances such as ammonia, amino acids, nitrates, and urea. As plants mature, the crude protein usually decreases.

DRY MATTER BASIS has results reported based on the sample dried until no moisture remains. This is called 100% dry matter and is used as a basis for comparing feeds and estimating intakes.

FIBER is the portion of the plant that provides the plant's structural strength and form. Generally, the vegetative parts, especially the stem, have the highest fiber content. Seed hulls and/or coats also often contain fiber. Fiber is composed of several different types of compounds and is the major constituent of plant cell walls. The components of fiber that provide the 'fiber' value are hemicellulose, cellulose and lignin. An adequate amount of digestible fiber is required in the diet of ruminants for efficient production and health. Fiber values in plants are a function of the growing conditions and maturity. As plants mature, the fiber levels increase.

METABOLIZED ENERGY (ME) is gross energy not lost in feces, urine or gas and doesn't account for energy lost in heat.**NEUTRAL DETERGENT FIBER (NDF)** is the portion of fiber that is composed of hemicellulose, cellulose and lignin. NDF is related to feed intake or bulk and can be used in ration formulation to predict forage intake and quality. Forages low in NDF are usually of high quality and have high levels of intake.

NET ENERGY-GAIN (NE_g) is an estimate of the energy value of a feed used for body weight gain above that required for maintenance. It is used in ration balancing for beef and sheep when gain is desired.

NET ENERGY-MAINTENANCE (NE_m) is an estimate of the energy value of a feed to maintain animal tissue without gain or loss of weight. NE_m is used in formulating beef and sheep rations for maintenance plus energy for pregnancy and lactation.

NET ENERGY-LACTATION (NE_L) is an estimate of the energy value of a feed used for milk production and body maintenance.

RELATIVE FEED VALUE (RFV) is used in feed marketing and comparisons, not in balancing a ration for animals. This term is useful for comparing forages of the same type. It is calculated from digestible dry matter and dry matter intake. Digestible dry matter is a function of ADF and dry matter intake is a function of NDF. Therefore, the fiber components have an integral affect on RFV. The relative feed value for grasses is usually lower than for mixed or legume forages. This is due to the higher fiber values associated with grasses, especially the NDF. For this reason it is questionable to compare the relative value of different species.

TOTAL DIGESTIBLE NUTRIENTS (TDN) is derived from animal studies by measuring the percentage of digestible carbohydrates, digestible protein and digestible fat (x 2.25). TDN values for hay, haylage and corn silage, however, can also be calculated on a dry matter basis using the forage Acid-Detergent Fiber (ADF) analysis.

TDN FROM PROXIMATE ANALYSIS was developed over 100 years ago in an attempt to use chemical determinations to describe the value of feeds for animals. The proximate factors used as components are crude fiber (CF); crude protein (CP); crude fat, often stated as ether extract (EE); nitrogen-free extract (NFE); and ash.

Reference: Definitions of Feed Manufacturing and Livestock Nutrition Terms. www.omafra.gov.on.ca/english/livestock
Recommended Terminology and Units for Parameters Used in Lab Reports, 4/29/2009 Revised by G. Shewmaker, T. Snyder, and D. Undersander
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