

### Hay Analysis\*

**(%) Dry Matter:** Represents everything in sample except water.

*Range: 90 to 94*

#### *Protein*

**(%) Protein :** Crude protein includes true protein and non-protein nitrogen (NPN) such as urea and ammonia. Proteins are organic compounds of amino acids. Proteins can be analyze further. (*RUP % Prot, SOL % Prot, ADFIP, NDFIP, ADICP, NDICP*).

*Range: 7 to 15*

#### *Energy*

**NEL Level 1:** an estimate of the energy value of a feed used for maintenance plus lactation.

*Range: 0.41 to 0.57*

**NEL 1X:** an estimate of the energy value of a feed used for maintenance.

*Range: 0.43 to 0.57*

#### **Total Digestible Nutrients (TDN%) (Not listed on Current Hay Analysis):**

Determining the energy content of a forage, feedstuff or mixed ration is more difficult than measuring nitrogen and calculating crude protein. Total digestible nutrients are actually calculated from crude protein, crude fat, crude fiber, and more soluble carbohydrates.

*Range: 52 to 62*

#### *Fiber*

**(%) ADF:** Acid Detergent Fiber (%) is a percentage of highly indigestible or slowly digestible fiber (cellulose or lignin) in a feed or forage. For example, the greater the ADF, the less digestible the feed and the less energy it will contain.

*Range: 34 to 44*

**(%) NDF:** Neutral Detergent Fiber is the most common measure of fiber used for forage analysis. It measures most of the structural components in plant cells (i.e. lignin, hemicellulose, and cellulose). As NDF values increase, total feed intake decreases. NDF is negatively correlated with feed intake.

*Range: 57 to 70*

**Lignin, %NDF:** Lignin as a % of NDF.

*Range: Calculated*

#### **%Lignin:**

Lignin is the key element that limits cell wall digestibility.

*Range: 5 to 8*

\* Grass hay ranges are from Dairy One Forage Laboratory Ithaca, New York

### *Nonstructural Carbohydrates (NSC)*

**% NSC WSC (Water Soluble Carbohydrates):** Water soluble carbohydrates measures simple sugars and fructans. WSC does the best job of quantifying rapidly fermentable carbohydrates in the rumen.

*Range: 6 to 15*

**% NSC ESC (Ethanol Soluble Carbohydrates):**

Ethanol soluble carbohydrates measures simple sugars.

*Range: 4 to 10*

**% NSC starch:** Starch is a sub-component of the NSC. Normal pH of the rumen (forage diet) is 7.0 to 7.4; at this pH the fiber digesters are very comfortable and work at maximum productivity. Small quantities of starch (grain) are not a problem. Large doses of grain can be serious.

*Range: 0.9 to 3.7*

### *Minerals*

**% Calcium:** Approximately 99% of the calcium in the body is found in the skeleton in combination with phosphorus (Ca:P ratio of 2.2:1). The remainder of the calcium is very important important for diverse body functions, include muscle contraction, neuromuscular excitation, and blood coagulation.

*Range: 0.3 to 0.7*

**% Phosphorus:** Phosphorus is required for both soft tissue and bone growth. It plays an important part in energy metabolism and acid-base balance.

*Range: 0.16 to 0.33*

**% Potassium:** Large amounts of potassium are required, this mineral is normally present in abundance in forage based diets and is well absorbed. Signs of potassium are reduced feed intake, poor growth, and reduced milk production.

*Range: 1.3 to 2.5*

**% Sulfur.** Sulfur is important in body protein because it occurs in sulfur containing amino acids such as methionine and cystine.

*Range: 0.11 to 0.24*

**% Magnesium:** Magnesium is required for many enzyme systems for energy metabolism and for normal neuromuscular function.

*Range: 0.12 to 0.28*

**% Chloride Ion:** Chloride is one of the 16 essential nutrients for plant growth. When formulating rations, four components are generally used to influence a goat's dietary cation anion difference (DCAD).

*Range: 0.2 to 1.1*

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