ROCK RIVER LABORATORY EUROPE
POWERED BY InnovationsTeam®

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Core Nutrient Definitions

Protein

Crude Protein (CP, % of DM): calculated after measuring nitrogen content. Protein is important for growth and performance.

Total amino acids (TAA, % of DM): indicates the sum of all amino acids; in contrast to CP no degradation products are accounted

Lysine (% of CP): essential and performance limiting amino acid

Methionine (% of CP): essential and performance limiting amino acid

Histidine (% of CP): essential and performance limiting amino acid

Soluble Protein (% of CP): determines how much protein is soluble in a water solution. CP solubility helps determine rapidly available protein.

Available CP (% of CP): determines how much of total CP is available for digestion and use by the animal. Calculated by subtracting ADF bound protein.

ADICP (Acid Detergent Insoluble CP) (% of DM): measures damaged and tightly bound protein that is not available for digestion and animal use. ADICP is defined as ADF bound protein.

NDICP (Neutral Detergent Insoluble CP) (% of DM): measures protein that is bound to the NDF fraction.

RUP (**R**umen **U**ndigestible **P**rotein): Protein which can not be degraded in the rumen.

Composition of Fiber Carbohydrates
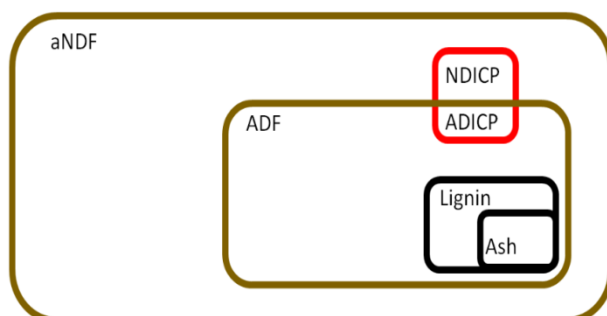
ADF (Acid Detergent Fiber) (% of DM): fiber measured using an acid detergent rinse.

aNDF (Neutral Detergent Fiber) (% of DM): fiber measured using a neutral detergent rinse with amylase and sodium sulfite. Fiber content is

important because it is a lower energy nutrient.

aNDFom (% of DM): aNDF corrected for ash content.

Lignin (% of DM): the woody fiber linkages measured using sulfuric acid. Lignin cross links like a zipper between fiber molecules and is not digestible by ruminants.

Fiber Digestibility

NDFD (% of NDF): fiber digestibility is important for nutritionists to estimate how much fiber ruminants can digest. The 24, 30, 48, 72, 120 and 240h and other time points define the length of time the fiber was digested.

tNDFD (% of NDF): fiber digestibility determined by the "traditional" Goering & van Soest method.

sNDFD (% of NDF): fiber digestibility determined by the "standardized" Combs-Goeser method

uNDF (% der TM): indicates the part of the fiber that has not been digested after a certain time. uNDF 240 is by definition CNCPS) the fraction of fiber that can never be digested and is equated with the iNDF (indigestible NDF).

NFC

Sugar (Ethanol Soluble Carbohydrate, ESC) (% of DM): measured by soaking the sample in ethanol and then reacting sugar-like compounds with other compounds. Sugar is highly digestible.

Sugar (Water Soluble Carbohydrate, WSC) (% of DM): measured by soaking the sample in water and then reacting sugar-like compounds with other compounds. This sugar analysis extracts more "sugar" than ESC and has recently been accepted as more accurate, relative to cow digestion and metabolism.

Starch (% of DM): measured by cleaving the starch molecules into individual glucose molecules and then reading glucose. Starch is an important nutrient for animal performance.

Starch Digestibility, *in situ* ruminal (% of Starch): measured after 0, 3, 7 and 16 hours, this parameter indicates the rate of degradation of the starch. This *in situ* method reflects best the actual degradation within the animal.

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Fermentation Products

Fermentation Products (pH, volatile fatty acids (VFA), ammonia-nitrogen (NH3 – N), ethanol and other alcohol compounds): these are unique feed components that are produced during fermentation (or preservation). Consultants assess these compounds to determine how well feed has been preserved.

Fermentation Shrink (% of DM): indicates how much of the harvested material gets lost during the ensiling process.

Minerals

Ash (% of DM): measured by burning the sample. Ash stems from soil contamination and from minerals within the plant.

Fat

Fat (EE, % of DM): fat-like compounds measured using an ether extraction. Fat is a higher energy nutrient and can be beneficial.

Total fatty acids (FA, % of DM): takes into account only the fatty acids and, in contrast to fat, is adjusted for other fat-like components.

Myristic acid (% of FA): saturated fatty acid (C14: 0)

Palmitic acid (% of FA): saturated fatty acid (C16: 0)

Stearic acid (% of FA): saturated fatty acid (C18: 0)

Oleic acid (% of FA): monounsaturated fatty acid (C18: 1)

Linoleic acid (% of FA): di unsaturated fatty acid (C18: 2)

Linolenic acid (% of FA): tri unsaturated fatty acid (C18: 3)

RUFAL (% of FA): stands for **R**umen **U**nsaturated **F**atty **A**cid **L**oad and indicates how high the level of unsaturated fatty acids is. To high RUFAL leads to butter fat depression.

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Calculation values

TTNDFD (% of NDF): Feed and cow factors are combined to determine a fiber digestibility index. This is calculated using the standardized NDF digestibilities after 24, 30 and 48 hours in combination with the uNDF240 value. Changing the diet by 2-3 units of TTNDFD results in a 0.5 kg change in milk yield in the same direction.

RFV: Relative Feed Value (assessed by ADF and NDF)

RFQ: Relative Feed Quality (Further Development of RFV)

Kd (% per h): rate of digestion

Kp (% per h): feed passage rate

TDN: Total Digestible Ingredients.

NEL (Mcal / kg): Net energy Lactation. NEL contains the energy needed for conservation and milk production.

NEM (Mcal / kg): Net energy for Maintenance. Energy requirements for breathing, walking, etc.

NEG (Mcal / kg): Net energy for growth. Energy requirement for muscle and bone formation.

NDR (Neutral Detergents Residues) (% of DM): fiber that still has traces of protein after rinsing a neutral detergent solution.

KPS (Kernel Processing Score): Standardized method to determine the chopping quality of corn silage by measuring the particle size of corn kernels in a sieving process.

Feed / Grain Particle Size: Standardized method to determine the milling quality of cereal pellets by measuring the particle size of the sample in a sieving process.