METHOD REFERENCES FOR FEED AND FORAGES

DRY MATTER/MOISTURE
c. Wet pet foods, meat, dry milk products and molasses – Dry samples at 103°C +/- 2°C for 16 h (overnight).

CRUDE PROTEIN (CP)
AOAC – Official Method 990.03. Protein in animal feed. Combustion method. Protein factor of 6.25 is used for calculation.

SOLUBLE PROTEIN AND DEGRADABLE PROTEIN (Streptococcus griseus)


CRUDE FIBRE
Grain samples containing greater than 10% fat must be defatted before determination.
a. AOCS Ba 6a-05. Crude fibre analysis in feeds by filter bag technique (ANKOM Technology)

ACID DETERGENT FIBRE (ADF)
ANKOM Technology Method 12. Acid Detergent Fiber in Feeds – Filter Bag Technique. AOAC 973.18 – Fiber (Acid Detergent) and Lignin in Animal Feed.

ADF NITROGEN (ADF-CP)
Residue from ADF procedure in filter bag is analyzed for nitrogen: AOAC - Official Method 990.03. Protein in animal feed. Combustion method.

ACID DETERGENT LIGNIN (ADL)
ADF residue digested in 72% w/w sulfuric acid for 3 hours at ambient temperature: AOAC 973.18D.

NEUTRAL DETERGENT FIBRE (aNDF)
Amylase and sodium sulphite is used.

**NDF NITROGEN (NDF-CP)**
Residue from NDF procedure (without sodium sulftite) in filter bag is analyzed for nitrogen: AOAC – Official Method 990.03. Protein in animal feed. Combustion method.

**IN VITRO NDF DIGESTIBILITY (NDFd)**
ANKOM Technology Method 3. In Vitro True Digestibility using the DAISY II Incubator – ANKOM Technology – 08/05.
Rumen fluid is collected from two lactating cows fed a TMR diet. Sample is ground to 1 mm and weighed (0.25-0.3 g) in filter bags. Sample plus inocula are incubated at 39°C at different time points. NDF analysis (Ankom Fibre Analyzer) is performed in the residue after incubation.

**CRUDE FAT**
Sample is extracted using petroleum ether.

**FAT, ACID HYDROLISIS**
AOAC Official Method 954.02 – Crude fat in pet food.
Method applicable to baked and extuded semi-moist pet foods, high temperature pelletized feeds and dried milk products. Sample is hydrolized in HCl solution to release bound fat and then extracted with diethyl ether and petroleum ether.

**STARCH**

**IN VITRO STARCH DIGESTIBILITY (SCHd) (High Moisture Corn and Corn silage)**
Rumen fluid is collected from two lactating cows fed a TMR diet. Sample is ground to 4 mm and weighed (0.5 g) in centrifuge tubes fitted with Bunsen valves. Samples and inocula are incubated at 39°C for 3 or 7 h. Starch procedure for residual starch determination.

**SUGARS**


c. Ethanol soluble carbohydrates or Simple sugars and Water soluble carbohydrates or Total sugars in forages.


Modification: Sample extraction is made by sonicator

ASH
AOAC - Official Method 942.05 - Ash in animal feed. Sample is subject to 600°C for 2 h.

ACID INSOLUBLE ASH – Official Method Ba 5b-68

MINERALS AND METALS
a. AOAC - Official Method 985.01- Metals and other elements in plant and pet foods by ICP – Sample is dry ashed, followed by acid digestion with HCl. Minerals are then analyzed by inductively couple plasma after appropriate dilution.


SULPHUR
a. AOAC Official Method 923.01 – Sulfur in plants. Magnesium nitrate method.

b. Sulphur by Combustion. LECO Sulphur Analyzer.

SALT (AS SODIUM CHLORIDE)
AOAC - Official Method 969.10 – Soluble chlorine in animal feed. Potentiometric titration.

CORN SILAGE PROCESSING SCORE (CSPS)

PARTICLE SIZE IN FORAGES
Heinrichs, J. Evaluating Particle Size of Forages and TMRs using the New Penn State Forage Particle Separator. The Pennsylvania State University, Department of Dairy and Animal Science.

PHYSICALLY EFFECTIVE NDF (PeNDF)
Mertens, D.R. 2002. Determination of Starch in Large Particles, Ro-tap Shaker Method. U.S. Dairy Forage Research Center. – NDF analysis is performed on particles less than 1.18 mm

PEPSIN DIGESTIBILITY OF ANIMAL PROTEIN (PD)
AOAC – Official Method 971.09 – 0.2% pepsin as per AOAC.
NITRATE

AMMONIA
Recommended Methods of Manure Analysis. Ammonium-N determination by electrode (adapted from Standard Methods for the Examination of Water and Wastewater; Method 4500-NH3F). Ch 4 Sec 2: 26 (2003). Five ml extract mixed with 45 ml deionized water are transferred to an extraction cup and 2 ml of NaOH (10 M) are added. Ammonia-N concentration is read with Ion Electrode.

UREA

UREASE ACTIVITY
AOCS - Recommended Practice Ba9-58 – Sampling and analysis of oilseed by-products.

FREE FATTY ACIDS
AOCS – Official Method Ca 5a-40.
AOAC - Official Method 940.28. Free fatty acids in crude and refined oils.

PEROXIDE VALUE

INSOLUBLE IMPURITIES
AOCS - Method Ca 3a-46. Insoluble impurities in oils and fats.

UNSAPONIFIABLE
AOAC - Official Method 933.08. Unsaponifiable residue of oils and fats.

IODINE VALUE
AOAC - Official Method 41.1.13 – Iodine value in oils and fats.

QUANTITATIVE ANALYSIS OF TOXINS
Toxins present in feed and cereals are determined using specific enzyme immunoassay kits of RIDASCREEN®FAST:
Zearalenon – Art N° R5502
Aflatoxin – Art N° R5202
T-2 Toxin – Art N° R5302

EZ-Tox™DON Test in grain and feed are determined by the enzyme immunoassay kit from Diagnostix (Cat # 600120-DON)