NEUTRAL DETERGENT FIBER
Updated September 2013

I. References:

Van Soest, P.J., J.B. Robertson and B.A. Lewis. 1991. Methods for dietary fiber, neutral detergent fiber, and non-starch polysaccharides in relation to animal nutrition. J. Dairy Sci. 74:3583.

Van Soest, P.J. and W.C. Marcus. 1964. Methods for the determination of cell wall constituents in forages using detergents and the relationship between this fraction and voluntary intake and digestibility. J. Dairy Sci. 47:704. (Abstract of 1964 Amer. Dairy Sci. Assoc., Univ. of Ariz. Tucson).

Defines: Hemicellulose, cellulose and lignin

II. Personal Protective Equipment:

A. Lab coat
B. Safety glasses/ goggles
C. Latex gloves
D. Thermo pad for removing beakers from hot plate

III. Procedure:

A. Weigh out 0.5000-0.5040 g of sample that has been ground through the Wiley mill with a 1-mm screen (**all high starch samples must be ground through the cyclo-tech**). Add 0.5 g of Sodium Sulfite for removal of protein.
B. Place in a Berzelius 600 ml beaker and add 100 ml of room temperature neutral detergent solution.
C. Turn the main power lines on and start water through condensers on fiber reflux apparatus.
D. Place the beakers on the digestion rack (hot plates) and cover with condensers; bring to boil rapidly.
E. **Record time that boiling begins for each sample.** Allow sample to reflux for one hour.
    1. Alpha-amylase may be added in 0.5 mL increments after reflux begins and ten minutes before filtering high starch samples.
F. While the samples are refluxing:
    1. Fill rinse water reservoir and heat to boiling
    2. Obtain dry weight on Gooch crucibles or Whatman 541 filter paper (minimum 3 hrs drying time in 100^{o}C oven).
    3. Rinse down sides of beaker, with NDF solution, during reflux if sample creeps up side of beaker and is no longer in contact with solution.
    4. If the sample boils up condenser, discard sample.
G. At the end of the reflux period, remove each beaker separately and wipe condenser with moist sponge to remove condensed detergent solution.
H. Place crucible on manifold and insure a tight seal and strong vacuum. Turn on small amount of suction and add hot water to crucible.
I. Slowly decant sample solution into crucible or filter. Once bulk of material has passed, open suction valve, wash out beaker with boiling water, and add to crucible. **Make certain that no residue remains in beaker.**
J. Wash residue with several volumes of boiling water and dry with vacuum.
K. Dry samples at 60°C for 24 hours or in a 100 ^{o}C lab oven for a minimum of 6 hours.

L. Transfer to a desiccator, reweigh dry crucible/filter and residue.

III. Calculations:

$$\text{NDF\%} = 100 \times \frac{(\text{Dry Crucible or Filter + Residue}) - (\text{Dry Crucible or Filter})}{(\text{Sample Wt})\ (\text{lab corrected DM})}$$