METHOD SPECIFICATION
Faculty of Biosciences, NMBU

Method name: aNDFom (ash corrected)
BIOVIT No: Msp1042

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1. Method of analysis/ Principle / Main instrument

The sample is heated in a neutral detergent solution with heat-stable alpha-amylase so that the content of the cells dissolves while the cell wall remains undissolved. This undissolved fraction is called Neutral Detergent Fiber (NDF) and is mainly hemicellulose, cellulose and lignin. The soluble fraction, "neutral detergent solubles" (NDS) consists of lipids, sugars, organic acids, water-soluble compounds, pectin, starch, non-protein nitrogen and water-soluble proteins (1). The amount of NDF is determined gravimetrically and the amount of NDS can be calculated. **a**NDF means that it is the enzyme alpha-amylase that has been added to break down any starch. (There are alternative enzymes).

The aNDF fraction determined usually contains a small amount of inorganic material. To correct for this inorganic part, the sample can be incinerated at 550 ° C. The residues after incineration are a measure of the inorganic part of the sample and one can then decide what is called ash-corrected aNDF, or aNDF on organic matter basis, (aNDFom). It is this form that is recommended for use by Animal Feed Science and Technology when NDF values are to be published in peer-reviewed journals (3).

Main Instrument: Ankom^{200} Fiber Analyzer (Ankom Technology)

2. Reference and any modifications

Neutral Detergent Fiber in Feeds - Filter Bag Technique (for A200 and A200I), 2017, NDF Method, Method 6 (Ankom Technology)

https://www.ankom.com/analytical-methods-support/fiber-analyzer-a200

Ashing:
ISO 5984, Animal feeding stuffs - Determination of crude ash.

Modification: The charring step is not performed.

3. Requirements for grinding and storage
The filter bags are made so they can withhold 95% of particles larger than 30 µm.

The method can be used on most sample types, but the manufacturer recommends that the particle size is not smaller than 1 mm for samples grinded on cutting mills and not smaller than 2 mm for samples grinded on grinding mills to guarantee good results. Smaller particles will increase the probability of errors in the analysis results, since they can escape through the pores in the filter bag. This will lead to the NDF value being underreported and NDS (Neutral Detergent Solubles) will be overestimated.

The samples must be at room temperature.

4. Contact persons

Lab manager: Hanne Kolsrud Hustoft
Responsible for analysis: Elin Kristoffersen / Heidi Askerud

5. Additional literature

1. ISO 16472. Animal feeding stuffs - ISO 16472. Animal feeding stuffs - Determination of amylase-treated neutral detergent fiber content (aNDF).

2. McDonald, P., Edwards, P. A., Greenhalg, J. F. D., Morgan, C. A., 2002. Animal Nutrition, 7th edition, Prentice Hall, Harlow.

3. Mertens, D. R., 2002. Gravimetric Determination of Amylase-Treated Neutral Detergent Fiber in Feeds with Refluxing in Beakers or Crucibles: Collaborative Study, *J. AOAC. Int.*, 85 (6), 1217-1240

4. Uden, P, Robinson, P. H., Wiseman, J., 2005. Use of detergent system terminology and criteria for submission of manuscripts on new, or revised, analytical methods as well as descriptive information on feed analysis and / or variability. Anim. Feed. Sci. *Tech*., 118, 181-186

5. Komarek A. R., 1994. Fiber Analysis System, Patent No. 5,370,007. Unites States Patent.