

ACID INSOLUBLE ASH
Updated September 2013

I. References:

Van Keulen, J.V. and B.A. Young. 1977. Evaluation of acid insoluble ash as a natural marker in ruminant digestibility studies. J. Animal. Sci. 44:282.

II. Personal Protective Equipment:

- A. Lab coat
- B. Safety glasses/goggles
- C. Latex gloves

III. Reagent:

- A. 2 N Hydrochloric Acid (HCl)
 - 1. Add 166.7 ml of concentrated HCl to approximately 700 ml of dH₂O
 - 2. Stir and q.s. to 1 L

NOTE: Prepare in designated fume hood

IV. Procedure:

- A. Weigh a 5.0 ± 0.0040 g sample in duplicate into a tared 50 ml ashing crucible.
- B. Dry overnight at 100 °C. Allow crucibles to cool in desiccator and reweigh.
- C. Ash 6 hours at 600 °C.
- D. Transfer ash to 600 ml Berzelius beaker adding 100 ml of 2 N HCl.
- E. Boil 5 minutes on fiber rack.
- F. Filter hot hydrolysate through Whatman 541 filter paper and wash with hot distilled water.
- G. Transfer filter paper back into crucible and ash 6 hours at 600 °C.
- H. Place crucible in 100 °C oven to re-dry. Cool in desiccator and weigh.

V. Calculation:

$$\frac{(\text{Wt. of Crucible + Ash} - \text{Wt. of Crucible}) \times 100}{\text{Sample Dry Weight}} = \% \text{ Acid Insoluble Ash}$$

Note: Van Soest recommends measurement of AIA as the residue from ADF after ashing at 525°C (Van Soest et al., 1991. J. Dairy Sci. 74:3583). Acid detergent quantitatively recovers all silica. This procedure is shorter than the Van Keulen and Young technique, which is also liable to incomplete recovery of silica due to lack of sufficient acid dehydration. The AIA after lignin determination by either K MnO₄ or Klason procedures is identical to that of the original ADF residue.