11.2 *In sacco* digestibility determination

Apparatus

- Nylon bag
- Plastic tube
- Rubber band/ nylon thread
- Hot air oven
- Washing machine
- Rumen cannulated animal

Procedure

Preparation of Sample

- Weigh 3.0 g sample for dry feeds (hays, straw etc) or 5.0 g sample for protein supplements and transfer it to nylon bag (35-50 µ pore size).
- Record the weight of bag plus sample.
- Attach the nylon bags to the respective plastic tubes for incubation and place them with bags in the rumen and tie the bags with cannula with a piece of nylon thread.
- Incubate the bags for 4, 8, 16, 24, 48, 72 and 96 h for roughage and for protein sample 2, 4, 8, 16, 24 and 48 h.
- Withdraw the bags and immediately place in a bucket of cold water to prevent further fermentation and to wash off the feed particles adhering to the outside of the bags.
- Transfer the bags in washing machine for 20 min for cold water washing. The bags could also be washed under running cold water in laboratory until the washing is clear.
- Detach the nylon bags from the tubes by cutting the rubber bands.
- Dry the bags at 60-65ºC for 48h and weigh the bags immediately after drying.

Calculation

Empty bag weight	(W)
Bag + feed sample before incubation	(W_1)
Bag + residue after incubation	(W_2)
Per cent dry matter in the feed sample	(DM %)
Sample dry matter weight	(W_1-W) x DM % = (W_3)
Residue dry matter weight	(W_2-W) = (W_4)

$$\text{DM disappearance (\%)} = \frac{W_3 - W_4}{W_3} \times 100$$

Degradation kinetics

The degradation kinetics of the incubated feedstuffs may be calculated by curvilinear regression of DM and other degradable components of the feed determined by nylon bag technique.

Potential degradability (P) = a + b (1-e^{ct})

Where,

a = y- axis intercept at time 0 that represents soluble and completely degradable substrate washed out of the bags (0h disappearance)

b = The difference between the intercept (a) and the asymptote that represents the insoluble but potentially degradable substrate

t = incubation time

c = The rate of disappearance of component 'b' per hour (rate constant)

a+b =The asymptote of the disappearance curve

1 – (a+b) = The un-degradable portion of a sample

Effective degradability (E) = a + bc / (c + k)

Where,

k = rumen small particle out flow rate.

The above equations assume that component 'b' disappears at a constant fractional 'c' per hour.

Reference: Orskov and McDonald, I. (1979). The estimation of protein degradability in the rumen from incubating measurements weighed according to rate of passage. *J. Agric. Sci.* (Camb) 92: 499.