

In Vitro True Digestibility (IVTD)

Background

IVTD is an anaerobic fermentation performed in the laboratory to simulate digestion in the rumen. Rumen fluid is collected from ruminally cannulated high producing dairy cows consuming a typical TMR diet. Forage samples are incubated in rumen fluid and buffer for 24, 30, 48 hours at 39° C. During this time, the microbial population in the rumen fluid digests the sample as would occur in the rumen. After the incubation, the samples are extracted with neutral detergent solution, leaving behind the undigested fibrous residue. This value is used to determine digestibility and digestible NDF (NDFD).

The result is a measure of digestibility that can be used to estimate energy. Energy values derived from in vitro measurements are more representative than those predicted from compositional data.

Application

To derive more precise estimates of forage digestibility than can be predicted from compositional data. Most useful:

- Ranking forages based on digestibility or digestible fiber.
- As a diagnostic tool when herds are not performing as predicted using conventional analyses.
- Fine tuning rations for exceptional herds.

Procedure

1. Sample required: standard 1 lb. (0.5 kg) forage sample.
2. Sample prep: dried at 60° C for 4 hours & ground through 1mm UDY Cyclone mill.
3. Sample size for analysis: 250 mg.
4. Method: ANKOM Daisy II Filter Bag Technique (FBT). F57 filter bags prerinsed in acetone and dried prior to filling with sample.
5. Buffer: Van Soest.
6. Incubation period: 24, 30, 48 hour end point measurement.

Donor Cows

Herd data: 436 cows, 2X milking, 22,825 lbs. milk, 823 lbs. fat (3.6%), 742 lbs. protein (3.3%).

Donor cows: Five cows averaging 80 lbs. milk/day. Cows are housed and managed as the part of the herd. No special treatment. Cows cease being donors once they drop below 60 lbs. milk/day.

Ration:

- TMR fed 1X/day with frequent push-ups and daily removal of leftover feed.
- Balanced for 95 lbs. milk/day.
- Forage: Concentrate, 55:45 DM basis.
- Forage; Corn silage: MML haylage, 70:30 DM basis.
- Concentrate; Corn/soy based mixed grain.

For Best Results

1. **FORAGES ARE THE KEY.** The procedure was designed for and works best on forages. If cows are not milking well, analyzing a TMR will tell you what you already know - that it is less digestible than predicted. The primary culprit is probably one of the forages that is not as digestible as predicted. Analyzing the most suspect or all forages will yield the most useful information.
2. **MAXIMIZE ACCURACY.** With all biological measurements, variation can occur from run to run. All steps are taken to minimize this variation. For best results, submit all samples for IVTD evaluation at the same time. This is particularly pertinent for research or field trial samples involving comparisons between multiple treatments or varieties. Call ahead and we will make arrangements to process your samples as a batch.
3. All IVTD analyses are started on Monday, the goal being to complete the analyses by Wednesday. Please take this into consideration when submitting samples.

Price

Single sample – \$13.00

Note: True vs. Apparent Digestibility

In Vitro Dry Matter Digestibility (IVDMD) or apparent digestibility is the classic two stage Tilley & Terry procedure. The first stage is a 48 hour incubation in rumen fluid and buffer followed by a second 48 hour digestion in pepsin and HCl.

The first stage of the In Vitro True Digestibility (IVTD) is a 30 hour incubation in rumen fluid. The incubation time was shortened to 30 hours from 48 to reflect the shorter rumen retention time in today's high producing cows. The second stage substitutes an NDF extraction for the pepsin and HCl. The NDF extraction more completely removes bacterial residues and other pepsin insoluble material yielding a residue free of microbial contamination. Additionally, it shortens analysis time by two days. In general, IVDMD can be estimated by subtracting 11.9 from the IVTD.