

Forage Analysis Factsheet - NIR v. Wet Chemistry

This document provides guidance on testing options available for nutritional analysis of forage samples.

Near Infrared Reflectance spectroscopy (NIR)

A widely used and accepted technique of analyzing forage samples in the UK for nutritional parameters is **Near Infrared Reflectance spectroscopy (NIR)**. Sciantec carry out nutritional analysis of forage samples by NIR, set format reports are available depending on the forage type submitted as detailed below:

Nutritional Analysis – Key Analytical Packages by NIR

Analysis Code	FN02	FN03	FN04	FN06	FN08	FN07	FN05	FN01
	Fresh Grass	Grass Silage	Hay & Haylage	Maize Silage	Whole Crop	Alkalage Silage	Lucerne & Other	Crimped Cereal
D Value	✓	✓	✓	✓	✓	✓	✓	
ME	✓	✓	✓	✓	✓	✓	✓	✓
FME		✓		✓	✓	✓		
NDF	✓	✓	✓	✓	✓	✓		
ADF		✓	✓					
Ash	✓	✓	✓	✓	✓	✓	✓	✓
Oil	✓	✓	✓	✓	✓	✓		✓
Dry matter solubility (S)		✓						
(a)		✓						
(b)		✓						
(c)		✓						
Starch				✓	✓	✓		✓
Bypass starch				✓				
Dry matter	✓	✓	✓	✓	✓	✓	✓	✓
Potential intake (FiM)		✓						
pH		✓		✓	✓	✓		✓
Ammonia N *		✓		✓	✓	✓	✓	
Pot. Acid Loading (FiM)		✓						
Crude Protein	✓	✓	✓	✓	✓	✓	✓	✓
ERDP		✓		✓	✓	✓		
DUP		✓		✓	✓	✓		
Nitrogen Solubility (N)		✓						
(a)		✓						
(b)		✓						
(c)		✓						
Sugar	✓	✓	✓					
Acetic Acid		✓		✓	✓	✓		
n Butyric Acid		✓		✓	✓	✓		
Tot. Ferm.Acids (FiM)		✓						
Tot. Volatile Fatty Acids				✓				
Lactic Acid		✓		✓	✓	✓		
Nitrate Nitrogen	✓							
Acid buffering Capacity	✓							
NCGD								✓

NIR instruments use infrared light to analyze materials. The results are not produced by the NIR machine itself but from the correlation between the spectra produced by scanning a material through the NIR machine and calibrations that have been developed. These results can therefore be considered as 'predicted' results.

NIR analysis is quick, relatively inexpensive and can provide a wide range of results that cannot all be replicated with wet chemistry methods.

Results are reported on a 'Dry Matter' (DM) basis.

Wet Chemistry

Wet chemistry may be considered the more traditional way of testing samples and generally capable of providing results that are more reliable or 'robust' compared to NIR. However, there are limitations when considering wet chemistry techniques for forage samples, not all the testing parameters available by NIR (and detailed above) can be replicated using wet chemistry methods and some tests are designed specifically for testing feed samples, not forages.

See below:

Tests NOT available by Wet chemistry methods on forage samples	
D Value	Pot. Acid Loading (FiM)
FME	ERDP
Dry matter solubility (S)	DUP
(a)	Nitrogen Solubility (N)
(b)	(a)
(c)	(b)
Bypass starch	(c)
Potential intake (FiM)	Acid buffering Capacity
Pot. Acid Loading (FiM)	Nitrate Nitrogen

Tests AVAILABLE by Wet Chemistry methods on forage samples	
NDF (Hemicellulose, Cellulose & Lignin)	Ammonia N
ADF (Cellulose & Lignin)	Crude Protein
ADL (Lignin)	Sugar
Ash	Volatile Fatty Acids
Oil	Lactic Acid
Starch	Water Soluble Carbohydrates
Dry matter	Ruminant ME – see additional notes below
pH	Ammonia N

'Ruminant ME' testing can be requested on forage samples, however the only method available to Sciantec to do this is by using a standard equation designed for use on 'Feeds'. This equation uses results from Moisture, Oil A & B, Ash and NCGD to calculate the ME value. Experience has shown that for some forage types, Ruminant ME by wet chemistry can produce lower results than by NIR method on the same sample.

Wet chemistry testing takes longer to provide results (within 10 working days) and is more expensive than NIR.

For samples tested by wet chemistry methods, consideration also has to be given to the fact that results are reported on an 'as received' basis. To enable conversion to 'DM basis', a moisture test is required to enable this (Ruminant ME includes moisture test).

Deciding whether to request NIR or Wet chemistry methods may therefore depend on the reasons for testing, the tests required and the budget available for testing.

For more information on Sciantec's services, or to request a quotation, please visit our website or contact us on the details provide below:



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