



## Understanding a Forage Analysis Report

### Crude Protein

(Is less important than NDF)

Goals: Hay crops – 15–20%, Corn Silage – 7–9%  
(For Corn Silage over 9 % usually indicates corn was not mature enough at harvest if coupled with high NDF and low starch)

### Soluble Protein

Silage (especially hay crops) goal is less than 55% of CP. Wet silages have higher soluble protein.

### Ash

Haycrop – less than 9%  
Corn Silage – less than 5%  
Levels above these usually indicate soil contamination.

### Minerals

#### Concern levels:

**Potassium** > 2.50% in haycrops  
(may indicate over-fertilization with potash)

**Iron** > 300 ppm  
(indicates soil or metal contamination)

Analyze minerals by “wet chemistry” methods for best accuracy.

### NDICP; ADICP

(Neutral & Acid Detergent Insoluble Crude Protein)

Measures of the crude protein bound to the fiber (NDF and ADF). Used to predict rumen protein availability.

### Neutral Detergent Fiber - NDF:

Correlates well with how much forage a cow can eat (gut fill). It is the basis for measuring NDF intake as % of animal bodyweight. Earlier cut hay = lower NDF  
Also measured as *aNDF*; *aNDFom* (NDF organic matter)

**uNDFom** = undigested NDF at given time point of incubation in rumen fluid. Used to estimate portion of fiber that is indigestible to cow.

**NDFD** = NDF digestibility. Measured at several time points of incubation in rumen fluid. Compare similar forage types at same time point. 30 hrs is commonly used. Also reported as *aNDFDom*

### Neutral Detergent Fiber goals

Grass hay and silage – 48 – 55%

MMG hay & silage – 40 – 50%

MML hay & silage – 38 – 45%

Legume hay & silage – 36 – 42%

Corn Silage – 38 – 44%

(Corn Silage over 44% may indicate immaturity at harvest)

*Get the NDF and DM right and a lot of the rest will follow.*

### Dry Matter:

Silage Bunks/Piles – 33-35%  
Silage towers/bags – 33-38%  
Baleage – 38 – 50%

### Evaluate this column

Forages are evaluated on a dry matter (DM) basis. % dry matter is in the **As Fed** column.

		Analysis Results	
		As Fed	DM
Components			
% Dry Matter		39.8	
% Crude Protein		3.3	8.2
% Crude Fat		1.1	2.7
% Ash		1.32	3.32
% Soluble Protein % CP			57
NDICP % CP			14.5
ADICP % CP			5.6
% Calcium		.05	.14
% Phosphorus			
% Magnesium			
% Chloride Ion			
Potassium			
Sodium			
% Sulfur			
PPM Copper			
PPM Iron			
PPM Manganese			
PPM Zinc			
% ADF			
% ADICP			
% NDICP			
% Lignin			
% NFC			
% TDN			
NEL, Mcal/Lb			
NEM, Mcal/Lb			
NEG, Mcal/Lb			
% Moisture			
% Available Protein		3.1	7.8
% Adjusted Crude Protein		3.3	8.2
Ammonia % Sol. Prot.			8
Degradable Protein%CP			75
% aNDFom		16.0	40.1
% Starch		13.1	33.0
Digestible Starch%Starch			64
% WSC (Water Sol. Carbs.)		1.0	2.6
% ESC (Simple Sugars)		1.0	2.4
PPM Molybdenum		.5	1.2
% Ammonia (Protein Equiv)		.14	.36
% Lactic Acid		1.99	5.00
% Acetic Acid		.33	.83
VFA Score			8.26
*SS NEL, Mcal/Lb			.72
*SS Proc. NEL, Mcal/Lb			.75
% Lysine		.08	.21
% Methionine		.05	.13
% uNDFom 30hr			15.2
% uNDFom 120hr			10.1
% uNDFom 240hr			9.4
NDFDom 30hr, % of NDF			62.1
NDFDom 120hr, % of NDF			74.8
NDFDom 240hr, % of NDF			76.5

**Lignin**  
Portion of the fiber increased with plant maturity and which is indigestible. It can be managed mostly by cutting date and interval for haycrops and selecting BMR hybrids for corn. Heat increases lignin content; For this reason 1<sup>st</sup> cutting haycrop is usually more digestible than 2<sup>nd</sup> cutting.



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**Dairy One**

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**Dry Matter:**

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Baleage – 38 – 50%

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**NFC – Non Fiber Carbohydrates**

Measure of Starch, Sugar and Pectin.  
This value was used more when labs were not routinely measuring starch and sugar as they do now.

**Starch**

Corn Silage goal = >30%  
Can range as high as 40% in conventionally harvested (not high chop) corn.  
High starch level can be misinterpreted as adequate if corn is too dry and kernels pass through cow undigested.  
There is not a lot of starch in haycrop forage.

**Starch Digestibility:**

Estimate of ruminal digestibility at 7 hrs.  
High = > 88%  
Moderate = 79-87%  
Low = < 78%

**WSC and ESC**

WSC = water soluble carbohydrates  
ESC = Ethanol soluble carbohydrates.  
Both measure sugars in plants. Use ESC to evaluate silage fermentation  
High quality silages often have sugar levels 3-8%. Sugar levels less than 3% in silages indicate either low sugar levels in harvested plants (sat in windrow too long) or extended fermentation in silo.  
Very dry silage/baleage and hay can have sugar levels over 10% (as there is little or no fermentation to use up sugars).

**NEL, Mcal/lb**

An estimated (calculated) energy content of feed.  
Haycrop goal > 0.65 Mcal/lb  
Corn Silage goal > 0.70 Mcal/lb  
Managing for NDF content and digestibility, starch level (in corn silage), proper DM content, and good fermentation (in silage) will ensure good forage energy content.

**Silage Fermentation**

Goals:  
Lactic Acid - >3% of DM  
Acetic Acid - <3% of DM  
VFA Score - >7.0

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% Sulfur			
PPM Copper			
PPM Iron			
PPM Manganese			
PPM Zinc			
-----			
% ADF			
% ADICP			
% NDICP			
% Lignin			
NFC		18.2	45.7
% TDN		29	73
NEL, Mcal/Lb		.30	.76
NEM, Mcal/Lb		.31	.77
NEG, Mcal/Lb		.20	.49
-----			
% Moisture		60.2	
% Available Protein		3.1	7.8
% Adjusted Crude Protein		3.3	8.2
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