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.

**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.

**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)

**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 1st cutting haycrop is usually more digestible than 2nd cutting.

**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)

**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.

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

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

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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

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

**Get the NDF and DM right and a lot of the rest will follow.**
**Understanding a Forage Analysis Report**

**Precision Feed Manager**

<table>
<thead>
<tr>
<th>Components</th>
<th>As Fed</th>
<th>DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter</td>
<td>39.8</td>
<td></td>
</tr>
<tr>
<td>Crude Protein</td>
<td>3.3</td>
<td>9.2</td>
</tr>
<tr>
<td>Crude Fat</td>
<td>1.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Ash</td>
<td>1.32</td>
<td>3.32</td>
</tr>
<tr>
<td>Soluble Protein &amp; CP</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>NDF, % Digestible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Fiber Carbohydrates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn Silage goal = &gt;30%</td>
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<td></td>
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<tr>
<td>Can range as high as 40% in conventionally harvested (not high chop) corn.</td>
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<tr>
<td>High starch level can be misinterpreted as adequate if corn is too dry and kernels pass through cow undigested.</td>
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<td></td>
</tr>
<tr>
<td>There is not a lot of starch in haycrop forage.</td>
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<td></td>
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<tr>
<td>Starch Digestibility:</td>
<td></td>
<td></td>
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<tr>
<td>Estimate of ruminal digestibility at 7 hrs.</td>
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<td></td>
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<tr>
<td>High = &gt; 88%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate = 79-87%</td>
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<td></td>
</tr>
<tr>
<td>Low = &lt; 78%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSC and ESC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSC = water soluble carbohydrates</td>
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<tr>
<td>Both measure sugars in plants. Use ESC to evaluate silage fermentation</td>
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<td>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.</td>
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<td>Very dry silage/baleage and hay can have sugar levels over 10% (as there is little or no fermentation to use up sugars).</td>
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**Starch**

**Non Fiber Carbohydrates (NFC)**

This value was used more when labs were not routinely measuring starch and sugar as they do now.

**Dry Matter:**

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- 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.

**Starch Digestibility:**

- 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