# Milk2006

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<table>
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<th>Field ID</th>
<th>Lab ID</th>
<th>Kernel Processed</th>
<th>KPS %</th>
<th>DSA %</th>
<th>IS-IV %</th>
<th>DM %</th>
<th>CP % DM</th>
<th>NDF % DM</th>
<th>NDFD % NDF</th>
<th>Starch % DM</th>
<th>Ash % DM</th>
<th>Fat % DM</th>
<th>DM Yield tons/ha</th>
<th>Starch Digestibility-1x % of Starch</th>
<th>Calculated from Regression, KPS, DSA, or IS-IV</th>
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Milk2006 Assumptions

- 1350 lb. (612 kg) milking cow consuming a 30% NDF diet
- Standard environmental conditions
- Single forage source
- Forage yield times milk produced per ton of forage estimates milk produced per acre
  - combines yield and quality into a single term
Milk2006 Calculations


- **Maintenance energy** (proportioned according to the % of energy from forage in the diet) is subtracted from forage energy intake to provide an estimate of the energy available from forage for conversion to milk (NRC, 1989).

- **DM intake** estimated from NDF (Mertens, 1987) and *in vitro* NDF digestibility (Oba and Allen, 1999).
Energy Calculations

$$TDN_{1X} = dCP + dFat + dStarch + dNonStarch + dNDF - 7$$


- $dCP = CP * .93$
- $dFat = (ether extract - 1) * 2.25$
- $dNonStarch = NFC - starch - 1.3$
- $dNDF = NDF * NDFD$
Intake calculations

Dry matter intake (kg) =

\[0.0115 \times \frac{612}{3}\]

One unit change in NDFD results in

0.12 kg change in intake

+ (NDFD - lab average NDFD) * 0.12 kg
Higher cutting height produced higher quality but yield was reduced to make uneconomical.
Energy Calculations

\[ \text{TDN}_{1x} = dCP + dFat + d\text{Starch} + d\text{NonStarch} + d\text{NDF} - 7 \]

- Previously estimated starch digestibility for either processed or unprocessed silage based on moisture content of the sample.
- **Kernal Processing Score (KPS)** only considers particle size and is not influenced by moisture and endosperm type. Ferreira & Mertens 2005 JDS & Ferreira (2002)
- **Degree of starch access (DSA)** measures starch liberated with heating and amylase. It is extremely sensitive to particle size, and moderately sensitive to moisture content and endosperm type. (Blasel et al, 2006)
- **In situ/in vitro (IS-IV)** total tract starch digestion (Sapienza 2002 Proc, Cornell Nutr Conf.)
Select an Adopted, High-yielding Hybrid Using Milk 2006 to Sort Corn Silage Hybrids

- High milk/ton means high quality (to right)
- High Milk/acre means high yield
- Upper right quadrant = high yield and high quality

Corn Hybrid Silage Performance in South Central Wisconsin
Take Home

- Corn silage quality is better described if NDF, NDFD, Starch and Starch digestibility are determined.
- Milk 2006 can combine yield and quality into a single term for comparison of hybrids.