Oilseed Press Evaluations: Preliminary Results

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Oilseed Producers Meeting March 19, 2013
Objective:

• To establish a protocol and evaluate different press designs used in the Northeast
  – Examine different presses
  – Measure performance
  – Analyze quality of oil & meal
Evaluating each press

• 3 CROPS
  – Canola
  – Soybean
  – Sunflower

• 3 METHODS
  – Method 1: Operator’s preferred tuning
  – Method 2: Faster processing, Less net oil
  – Method 3: Slower processing, More net oil

• 3 PRESSESES (so far)
Press Overview

- Hopper
- Motor
- Variable Speed Control
- Heater
- Gear Box
Press Overview

Collar

Nozzle

Barrel
Press Overview

Nozzle

Collar

Screw
Evaluation

• Set-up press
  – Screw type, nozzle size & speed

• Press a set amount of oil (0.5 lb)
  – Timed

• Measure temperatures

• Collect oil and meal
  – weight of oil + weight of meal
    = weight of seed pressed

• Samples for analysis
Capacity – Pounds of seed in 24 hours of operation (preliminary results)

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<th>Screw Speed RPM</th>
<th>Canola</th>
<th>Soy</th>
<th>Sunflower</th>
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Capacity

- No single number captures this
  - Seed / crop dependent
  - Drive speed dependent
  - Nozzle dependent
- High screw RPM = High seed through-put
- The “speed” indicator is usually Hz of the drive
  - Not screw speed in RPM

* Preliminary results
“Net” Oil Yield (prior to settling) – preliminary results

- Increase in oil yield at 50% speed
- Peak oil yields

24 hr capacity

Canola, Soy, Sunflower

AgOil M70, Canola, Soy, Sunflower

KernKraft KK40

Taby 70
Oil quality

Samples sent to Dr. Ryan Elias at Penn State University for quality testing

- Gum content
- Free fatty acids / lipids
- Degumming
- Bleaching
- Stability
- Shelf life
- Color
- Tocopherols
- Trace metals

### 1st 2 Presses Evaluated:
% Sediment in 0.5-lb Oil Sample

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Meal quality

Samples sent to Cumberland Valley Analytics for nutritional analysis

- Crude protein
- Free fatty acids / lipids
- Acid Detergent Fiber (ADF)
- Neutral Detergent Fiber (NDF)
- Digestible NDF (NDFD)
- Total Digestible Nutrients (TDN)
- Net Energy for Lactation (NE\textsubscript{L})
- Fat
- Starch
- Micronutrients
Other Observations

• Lots of variables / adjustments
• Main press differences
  – Cost
  – Capacity
  – Barrel length
  – Number of screw types
  – Collar / nozzle gap
• Hand-holding
Summary & Next Steps

• Data review
• Additional presses: Keller, Komet, Oil Prince
• Oil and meal analyses
• Press manufacturer surveys
• Press owner / operator surveys