<table>
<thead>
<tr>
<th>Plant</th>
<th>Yield (seed) lbs/acre</th>
<th>Biodiesel gal/acre</th>
<th>Plant</th>
<th>Yield (seed) lbs/acre</th>
<th>Biodiesel gal/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>7800</td>
<td>18</td>
<td>Safflower</td>
<td>1500</td>
<td>83</td>
</tr>
<tr>
<td>Oats</td>
<td>3600</td>
<td>23</td>
<td>Rice</td>
<td>6600</td>
<td>88</td>
</tr>
<tr>
<td>Cotton</td>
<td>1000</td>
<td>35</td>
<td>Sunflower</td>
<td>1200</td>
<td>100</td>
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<tr>
<td>Soybean</td>
<td>2000</td>
<td>48</td>
<td>Peanut</td>
<td>2800</td>
<td>113</td>
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<tr>
<td>Mustard</td>
<td>1400</td>
<td>61</td>
<td>Rapeseed</td>
<td>2000</td>
<td>127</td>
</tr>
<tr>
<td>Camelina</td>
<td>1500</td>
<td>62</td>
<td>Coconut**</td>
<td>3600</td>
<td>287</td>
</tr>
<tr>
<td>Crambe</td>
<td>1000</td>
<td>65</td>
<td>Oil palm**</td>
<td>6251</td>
<td>635</td>
</tr>
</tbody>
</table>

** Yield given in lbs of oil/acre

Source: Biofuel Variety Trials Factsheet, USDA-ARS and WSU, Prosser, WA
Various oil crop seeds

Camolina  Soybeans  Canola
Various oil crop seeds

Camolina

Soybeans

Canola
PSU Experience with Canola

Young crop
PSU Experience with Canola

In flower
Ready for harvest

PSU Experience with Canola
PSU Experience with Canola

Harvest
PSU Experience with Canola

Additional cleaning
PSU Experience with Canola

Canola seed
Harvest – spring/summer 2008

- ~ 40 bushels/acre
- ~2.25 gallons of oil/bushel
- = 90 gallons of oil/acre
PSU Experience with Sunflowers

2007: 1530 lb/a = 612 lb oil/acre = 80 gal/acre
PSU (not) Experience with Sunflowers
PSU Experience with Sunflowers

Harvest
Methods of extracting oil from oil seeds

- Solvent extraction (hexane extraction)
- Cold pressing (expeller pressed)
PSU Experience with Seed Press

Kern Kraft 40 press
PSU Experience with Seed Press

Expeller

Meal

Oil
Cross Section of Komet Expeller
PSU Experience with Seed Press

Expeller with head and barrel removed
PSU Experience with Seed Press

Barrel
PSU Experience with Seed Press

Temperature
PSU Experience with Seed Press

Canola Meal
PSU Experience with Seed Press

Heater band

Heater band on press
PSU Experience with Seed Press

Controls
PSU Experience with Seed Press

100 ml canola oil settled for ~ 5 days
PSU Experience with Seed Press

Initial filtering
PSU Experience with Seed Press

Currently
• 25 µ
• 5 µ
• 1 µ

Final filtering
Fendt vegetable oil powered tractor – introduced by OEM Fall, 2008 in Europe: option not available in North America
PSU Experience with SVO machinery

New Holland T7060 tractor

Case 621E front-end loader
Additional oil treatment may be necessary

Clarification - filtering

Degumming – removing phospholipids

Refining – FFA’s stripped with NaOH

Bleaching – color reduction, standardization

Deodorizing - distillation
Additional Information

Questions?

Comments?