

The Economic potential of on-farm processing of canola into oil and meal in Pennsylvania

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Problem Statement: The crop prices farmers receive are discounted by the transportation costs to bring crops to market. This discount, known as negative basis, retards the adoption of new crops like canola because they are very heavily discounted. At the same time, local prices paid for oil and meal processed from canola oilseed may be substantial. As the gap (crush margin) between discounted oilseed and high-valued products widens, on-farm processing may add profit to the farming enterprise and/or reduce feed and energy costs.

Soybean, an established oil and protein crop, is also discounted. It is included in this analysis with canola because its later harvest and high meal value improve the overall profitability of the proposed enterprise.

Objective: To determine if the crush margin between the discounted oilseed price and the prices received for oil and meal is great enough to justify a profitable farm-scale oilseed processing plant.

Method of analysis:

- Use of market pricing to estimate the expected profitability of the processing enterprise
- Prototype processing plant based on 2- and 4-ton/day oilseed processing over a 180-day period
- Estimated capital and operating budgets based on industry published product, performance and price information
- Calculation of financial performance based on indices such as payback period, cash flow, net present value (NPV) and internal rate of return (IRR)

Conclusions: Where oilseed production is a farm cost center, processing can be profitable. If oilseeds are a cash crop and run as a profit center, returns from processing may have risk. This is especially relevant for the 2 ton/day example, where capital costs are never fully recovered in this example. At today's oil and meal prices, the 4-ton/day prototype at opportunity cost pays back capital costs in 3.2 years and shows a net present value at an 8% discount of \$13K over 5 years. A short payback is advantageous to reduce the risk of price fluctuations in an encouraging but not stable oil price marketplace.

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The crush margin may indicate a business opportunity:

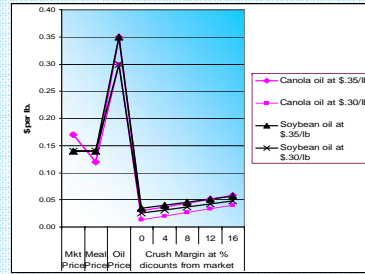


Fig. 1. The crush margin compared to oilseed, oil and meal prices. As the discount for transportation increases, the crush margin widens and makes on-farm processing more attractive.

Current discounts for canola are in excess of 12%; for soybeans, they are about 8%. These discounts are high enough that the breakeven charted in fig. 4 shows cost coverage at about 16 hours of operation per day. The system works most profitably when run on an automated 24-hour basis.

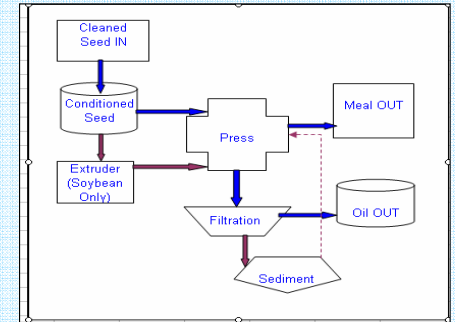


Fig. 2. Typical plant processing oilseed to crude, non-degummed oil and 7-12% fat meal.

Project Financial Performance

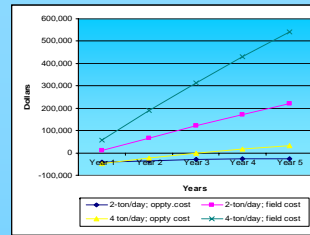


Fig. 3. Cumulative cash flows for oilseed acquisition and plant size alternatives.

Statistic	2-Ton/day Plant		4-Ton/day Plant	
	Mkt. oppty cost	Field cost	Mkt. oppty cost	Field cost
NPV at 8%	-\$28,857	\$167,569	\$12,556	\$420,847
IRR	-22.84%	111.98%	14.67%	170.40%
Cum Cash Flow	-\$24,649	\$220,169	\$32,774	\$541,772
Payback	>5 yrs.	0.9 yrs.	3.2 yrs.	0.9 yrs.

Table 1. Financial statistics for the processing plant. NPV, IRR and Cum Cash Flow based on 5 years.

Operated as a Cost Center using field production costs, processing delivers favorable cumulative cash flow. As a Profit Center, the project is risky and does not cover costs in the 2T/day example..

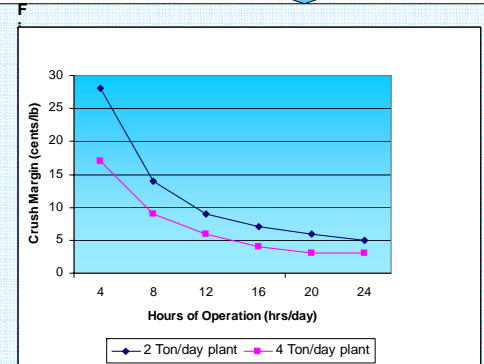


Fig. 4. Break even crush margin versus daily hours of operation. The crush margin needed for profitable decreases with increased hours of operation.

Estimated capital and operating costs for 2- and 4-Ton/day Plants

Table 2. Estimated capital costs for 2- and 4-ton/day plants

Item	Cost	
	2-T/day Plant	4-T/day Plant
Oilseed production	\$46,773	\$112,254
Labor	12,000	20,000
Utilities	2,400	4,500
Maintenance	1,000	2,000
Rent + Interest	6,656	8,324
Depreciation	10,120	21,204
Total	\$78,949	\$168,282

Table 3. Estimated operating costs for 2- and 4-T/day plants at production and opportunity oilseed costs

Item	Field Cost		Market Oppty Cost	
	2-T/day	4-T/day	2-T/day	4-T/day
Oilseed cost	\$46,773	\$112,254	\$98,661	\$201,116
Labor	12,000	20,000	12,000	20,000
Utilities	2,400	4,500	2,400	4,500
Maintenance	1,000	2,000	1,000	2,000
Rent + Interest	6,656	8,324	6,656	8,324
Depreciation	10,120	21,204	10,120	21,204
Total	\$78,949	\$168,282	\$130,837	\$257,144

The oilseed processing operation requires a skilled mechanic to operate it on a 24-hour basis for 6 months of the year. Costs to market the products may be substantial and should not be neglected.

Assumptions in the Analysis

Processing:

- Acreage needed to process:

	2-T/day Plant	4-T/day Plant
Oilseed	130	259
Soybean	130	259
Canola	127	255

- Plants operating 24 hours/day; 180 days/year or 4,300 hours/year in the timeframe July-December. This scenario provides the best return overall.
- Press efficiency 83%; soybean meal contains 7-8% fat; canola meal, 11-12% fat

Financial:

- Cost centers such as in livestock production use field production costs, estimated at: Soybean: \$158.14 per acre or \$3.51/bu with 45 bu/acre yield Canola: \$206.43 per acre or \$3.97/bu with 55 bu/acre yield
- Profit centers such as crop farms use opportunity cost, the discounted market price. Here, \$8.50/bu discounted 12%
- Financing 25% of capital cost at 8% over 5 years
- Depreciation schedule based on 5 years, straight line