Figure 1. Camelina systems approach diagram.

40.5 ha dry land camelina

180 head on feed 90 days

6,019 liters of Bio-diesel produced

14,727 kg of meal produced

6,019 liters of oil produced

Yield (561kg/ha)

1,083 liters of glycerin

Opportunity cost of feeding and bio-diesel production

* Methanol
* Sodium Hydroxide
* Electricity
* Maintenance
* Depreciation
* Land
* Fertilizer
* Fuel
* Equipment debt service
* Maintenance
* Depreciation
* Alfalfa
* Grass hay
* Grazing
* Veterinary

|  |  |  |
| --- | --- | --- |
|  | **Metric** | **US** |
| Area of camelina planted | 40.5 ha |  100 ac  |
| Area harvested (90%) | 36.4 ha |  90 ac  |
| Yield | 561kg/ha |  500 lb/ac  |
| Total harvest  | 20,454 kg |  45,000 lbs  |
| Percent oil |  0.34  |  0.34  |
| Percent meal |  0.66  |  0.66  |
| percent of oil extracted |  0.80  |  0.80  |
|  |  |  |
| Total weight of oil |  | 5,564 kg  | 12,240 lbs |
| Total weight of meal | 14,891 kg |  32,760 lbs |
|  |  |  |
| Total volume of oil |  | 6,019 liters |  1,590 gallons |
| Total weight of meal | 14.89 tonnes |  16.38 tons |
|  |  |  |
| **Feeding**  |  |  |  |
| Feeding rate | 0.91kg/day |  2 lbs/day  |
| number of days on feed | 90 |  90  |
| number of head on feed  | 180 |  180  |
| total consumption of meal  | 14,727 kg |  32,400 lbs  |
| residual meal  | 164 kg |  360 lbs |
|  |  |  |

**Table 1.** Camelina calculator base model annual yield and feeding results.

**Table 2**. Camelina calculator base model summary results

|  |
| --- |
| **Camelina growing costs** |
|  |  | Total operating costs | -$118.21 |  |
|  |  | Total ownership costs | -$114.83 |  |
|  |  | Total costs | -$233.04 | per hectare  |
|  |  |  |  |  |
|  |  | Value of seed if sold | $4,132 | Per hectare@$0.202/kg and 561 kg/ha |
|  |  |  |  |  |
|  |  | Pressing cost | $53.61 | electricity |

|  |  |  |
| --- | --- | --- |
| **Biodiesel production costs** |  |  |
| Total equipment costs | $19,443 |  |
| Biodiesel production costs |  |  |  |  |  |
|  Including ownership costs | **$1.29** | per liter |  | Total cost  |  $7,763 |
|  |  | difference between buying and making biodiesel | -$3,346 |
|  |  |  |  |  |  |  |  |
|  Operating costs only | **$0.36** | per liter |  | Total cost  | $3,129 |
|  |  | difference between buying and making biodiesel | $1,290 |

|  |  |
| --- | --- |
| **Costs avoided if biodiesel produced** | per year |
|  | 6,018 | liters of diesel fuel at  | $0.734 | per liter |  | $4,417 |
|  |  14,891 | kg of feed at  | $0.524 | per kg |  | $7,796 |
|  |  |  |  |  |  | $12,215 |

|  |  |  |
| --- | --- | --- |
| **Total costs/savings** | With ownership | Operating costs only |
| Fuel costs avoided | $4,417 |  | $4,417 |  |
| Feed costs avoided | $7,763 |  | $7,736 |  |
|  | **$12,153** |  | **$12,153** | Estimated savings |
|  |  |  |  |  |
| Growing costs | $9,435 |  | $4,786 |  |
| Biodiesel production costs | $7,778 |  | $2,157 |  |
|  | **$17,213** |  | **$6,943** | Total estimated annual costs |
|  |  |  |  |  |
|  | **-$4,998** |   | **$5,272** | Total estimated cost/savings |
|  |  |  |  |  |
|  | **$0.83** | Per liter subsidy required for breakeven |
|  | **$1.56** | Per liter breakeven price |

**Table 3**. Camelina production costs, base model.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  | Total costs | Operating costs only |
|   |   |   |   | Per liter | Per batch | Per liter | Per batch |
| Camelina oil, gallons |  |  | $0.919 | $173.94 | $0.148 | $27.58 |
| Chemicals |  |  |  | $0.040 | $7.50 | $0.040 | $7.60 |
| Annual operating cost |  |  | $0.008 | $1.69 | $0.008 | $1.69 |
| Capital depreciation (5% of startup) | $0.161 | $30.58 | $0.00 | $0.00 |
| Annual maintenance costs (5% of startup) | $0.161 | $30.58 | $0.161 | $30.58 |
| Total |  |  |  | **$1.28** | **$244.65** | **$0.357** | **$67.84** |