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** |