

“SQUEEZINGS” — SUN OIL MEAL FOR CATTLE

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The possible use of sunflower oil as a part of the diesel fuel in farming operations is currently under research in several countries of the world. A small screw expeller (capacity of about 100 pounds of sunflower seeds per hour) has been used to assess the possibility of on-the-farm processing. The residue after the oil extraction includes the hulls, protein, some starch, oil, and minerals. This residue is referred to as “squeezeings” to distinguish it from sunflower seed oil meal of higher protein and lower oil content (usually 2 percent or less) produced by commercial extraction.

The squeezeings are quite variable in chemical analyses depending on number of extractions and batch. Analysis of these squeezeings were: crude protein, 21.7 (range 19 to 23); acid detergent fiber, 32.4 (29 to 34); acid detergent lignin, 11.2 (10 to 12); phosphorus, 0.78 (0.7 to 0.9); calcium, 0.22 (0.2 to 0.28); and ether extract, 29.3 (21 to 33) percent. The ether extract was primarily oil. The small expeller removed only about half of the oil.

It was necessary to evaluate this by-product as livestock feed since using the whole seed for feed and observing the affect of oil does provide some feeding problems.

EXPERIMENTAL DESIGN

A limited amount of squeezeings was available from an agricultural engineering research project. Eighteen dairy-type steers which had previously been used in immunological studies were allotted to three lots of six steers each. A fourth lot of six dairy steers of much heavier weight was included to see if large amounts of squeezeings could be fed as an energy source. Table 1 gives treatment and results of this 92-day trial.

The steers were weighed four times during the trial and gain and feed intake recorded. The control lot (lot 1) was fed a ration marginal in protein. Lot 2 was fed squeezeings, 2.6 pounds per head daily, as a possible protein source. Lot 3 was supplemented with 1 pound per head daily of a 41 percent sunflower oil meal (dehulled). Squeezeings were substituted for corn as an energy source in lot 4.

The results for the first three lots are of questionable value because of the variation of gains among steers within treatment. This was particularly true for lot 3, where gains of the six steers varied from 1.21 to 2.5 pounds per head daily. The steers were thin and should have gained very well. It is not known whether previous treatment was the cause of this variation. The rations were formulated to be deficient in protein, but a change in hay quality apparently provided adequate protein.

Lot 4, although not comparable to the other three lots, does provide some information as to the value of the squeezeings as an energy source. The response to this source of energy was definite. There was no problem with acceptability of the squeezeings, and after 48 days the steers were consuming 12 pounds per head daily. This amounted to an intake of about 3.5 pounds of oil daily. The average daily gain for the first 48 days was only 0.17 pounds per day even though these steers started the experiment gaining at reasonable levels. This meant that the steers were actually losing weight at time of weighing. The steers were scouring badly and looked gaunt and very unthrifty. The amount of squeezeings fed was cut in half and the corn and hay allowance increased when the steers lost weight. The steers gained 2.15

TABLE 1. “Squeezeings,” Sun Oil Meal for Dairy-Type Cattle*

Lot	1 Control	2 Squeezeings	3 SOM	4 Squeezeings
Avg. Initial wt. lb.	394.7	461.3	456.7	747
Avg. Final wt. lb.	623.8	664.7	636.8	850
Avg. Daily Gain lb.	2.49	2.21	1.96	1.12
Daily Feed Consumption lb.				
Corn	9.98	9.54	10.88	2.46
Hay	5.82	6.11	4.88	5.66
Squeezeings	—	2.61	—	10.87
Sun Oil Meal	—	—	0.99	—
Total	15.82	18.5	16.98	19.23
Feed/lb. Gain				
Corn	4.00	4.32	5.56	2.20
Hay	2.34	2.76	2.48	5.05
Squeezeings	—	1.18	—	9.71
Sun Oil Meal	—	—	0.51	—
Mineral	0.09	0.11	0.12	0.12
Total	6.43	9.37	8.67	17.17

*Six steers/lot for 92 days

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pounds per day for the next 44 days. The average oil intake for this 44-day period was 1.76 pounds per head daily. Even though the gains for this last period were quite good, the steers still did not show the bloom and thriftiness normal for steers on feed.

In another trial, two lots of six dairy steers were used to further evaluate squeezings as an energy source. The limited amount of squeezings available was enough to feed six steers for 84 days. The squeezings in this trial had an average percentage composition as follows: dry matter, 92; crude protein, 22; acid detergent fiber, 30.2; acid detergent lignin, 9.7; phosphorus, 0.8; calcium, 0.3; and oil, 20.7 percent.

The steers were weighed every 21 days and feed intake recorded. Hay was fed once daily and concentrate twice daily. Feeding was done inside with water available in outside pens. Gains, feed intake, and efficiency are summarized in Table 2. The steers on the control ration (lot 1) gained 12 percent faster and required 10 percent less feed per pound of gain. However, this does not describe the results adequately. The steers consumed the squeezings very well. When the intake reached about 5 pounds per day (1 pound of oil) they started to scour. As the intake was increased to 9 pounds of the squeezings, the scouring became severe and they were gaining only about 80 percent as fast as the control steers. At this time the squeezings were reduced and the corn increased to allow the steers an opportunity to recover.

TABLE 2. "Squeezings" as Energy Source for Cattle, Six Dairy Steers per Lot, 84 Days.

	Control	Squeezings
Lot	1	2
Initial wt. lb.	433	433
Final wt. lb.	688	655
Average Daily Gain lb.	3.04	2.72
Average Daily Feed Consumption		
Alfalfa Hay lb.	5.83	6.09
Corn, Cracked lb.	12.95	5.58
Squeezings, lb.	—	7.88
Sun Oil Meal, 34% lb.	1.65	—
Total	20.43	19.55
Average Feed/lb. gain, lb.		
Alfalfa Hay lb.	1.92	2.31
Corn Cracked lb.	4.26	2.12
Squeezings lb.	—	2.98
Sun Oil Meal, 34% lb.	0.55	0
Total	6.73	7.41

Results from this trial as well as others utilizing squeezings and whole sunflower seeds indicates that feedlot steers should not be offered these products in amounts to exceed 1 pound of oil intake per day. It appears that the rumen flora and fauna are unable to acclimate to a higher level of this highly unsaturated oil.

LITERATURE CITED

Cook, Dave and W. E. Dinusson. 1981. (Unpublished)