

# **Feeding Cold Press Cake and Glycerol from Oilseed Biodiesel Production**

Vern Racz and Bernard Laarveld  
Dept of Animal and Poultry Science  
University of Saskatchewan

# Feed Sources in Dairy Production

- Long term projection – Higher cost of grains a permanent feature
- Shift towards alternate feed sources especially for energy:
  - Improved forage/silage quality and yield
  - By-products such as from biofuels and biorefining (crop processing)
- More local sourcing of by-products
- More variety and more variable feed quality

# Two Major By-products from Oilseed Biodiesel Production

## 1. Oil seed meal or oil seed cake

- Depends on oil extraction method
- Cold press extraction results in higher oil content in cake (9%)
- Oil seed source can be non-canola – possibility of increased supply of high glucosinolate mustard, rapeseed

## 2. Glycerol (glycerin) - 10% of oil

- Not approved feed ingredient CFIA

# Lactation Trial with High Glucosinolate Mustard Cake

- Cleaned mustard (*Brassica Juncea*; Oriental) was crushed by Milligan Bio-Tech @ 102 °C
- Contained 9 % oil
- Preliminary feeding trial showed at what level cows were starting to back off the feed
- Fed at 0, 2, 4 and 6 % of the supplement
- Supplement was 1/3 of concentrate (rolled barley)  
TMR: concentrate : roughage = 50:50
- Fed to 8 cows with experimental periods of one month

# Feed Intake and Body Weight

Items	CTL	MC-2	MC-4	MC-6	Std Error of Mean	Level of Sign for Trt effect
<b>Intake</b>						
Dry Matter Intake	26.90	26.89	26.38	26.51	0.38	0.6268
Hay/silage	33.45	33.34	32.84	33.36	0.44	0.5113
Hay/silage Dry Matter	13.73	13.85	13.46	13.44	0.23	0.4361
Concentrate	14.71	14.57	14.44	14.61	0.20	0.7932
Concentrate Dry Matter	13.17	13.04	12.93	13.07	0.18	0.7921
% Concentrate	49.30	48.96	48.92	48.45	0.31	0.3469
Body Weight change, g/d	557.6	207.9	293.3	-45.5	160.23	0.1385

# Lactation and Efficiency

Items	CTL	MC-2	MC-4	MC-6	Std Error of Mean	Level of Sign for Trt effect
<b>Yield, kg/d</b>						
Milk	39.76	38.98	39.72	38.59	1.58	0.5796
FCM (3.5%)	39.54	38.61	39.78	38.00	1.04	0.2337
Protein	1.37	1.36	1.35	1.30	0.05	0.3749
Fat	1.38	1.34	1.39	1.31	0.05	0.1936
<b>Milk composition</b>						
Fat %	3.53	3.47	3.53	3.45	0.18	0.7154
Protein %	3.47	3.51	3.41	3.39	0.09	0.0573*
Lactose %	4.46	4.50	4.53	4.49	0.08	0.4467
Somatic Cell Count	39.75	45.38	46.13	45.75	11.76	0.9042
Protein : fat ratio	1.00	1.02	0.98	1.01	0.05	0.6179
<b>Efficiency</b>						
Feed : Milk Yield ratio	0.68	0.70	0.67	0.71	0.02	0.0214**

# Conclusions

- Mustard cake was well tolerated at 2 and 4 % of the supplement in cows fed the supplement over 30 day periods.
- 6% mustard cake in the supplement (or 2% in the concentrate) might represent the upper limit and cows should be monitored carefully.

# Glycerol as Energy Feed

- Waste product from biodiesel production and cheap
- Product quality is variable (63-99 % purity) with contaminants salts, fatty materials, and **methanol**
- Unique energy source - best potential for transition and high producing cows for improved energy metabolism and prevention of ketosis
- In feed and as a liquid for drenching (substitute for propylene glycol)
- Lubricating agent (pelleting) and dust suppression



# Current Knowledge of Use of Glycerol in Dairy Cattle

- Feed up to 15% of ration dry matter (Donkin et al. 2009)
- Up to 0.86 kg/d for transition cows (DeFrain et al. 2004)
- Rapidly fermented. Risk of over-feeding → high ketone production in rumen may inhibit feed intake and push cows into ketosis.  
Need to know feeding limits.
- **Energy value equal to corn** – price comparison
- But - chemical industry may consider use of glycerol as an input (platform) chemical →\$?

# Lactation Trial Glycerol Feeding

- Trial is in progress
- Glycerol sourced from Cargill Animal Nutrition (highly pure form; CFIA licensed for use in beef cattle)
- Testing 4 levels: 0, 0.6, 1.2 and 2.4 kg/head/d to replace grain in TMR
- Diets were well tolerated
- Evidence of milk fat depression. Need to compensate for absence of fiber in glycerol
- Next trial in transition cows

Thank you