

Evaluation of the economic impact of Optigen® use in commercial dairy diets with varying feed and milk prices

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Introduction

While nutritionists are typically concerned with the effect of protein source on ration cost, there is a growing appreciation of the cost of inefficient crude protein (CP) usage. As a result, nonprotein nitrogen (NPN) is used in dairy rations as a less expensive alternative to protein of plant or animal origin.

Materials and Methods

Animals and experimental design

- 16 commercial Wisconsin dairy herds (average 148 cows/herd; range 58 – 550 cows/herd).
- Crossover experimental design using two 30-d feeding periods.
- Within herds, cows were fed a single-diet TMR.
- Across the 16 herds, TMR contained 56±3% forages composed of 43±9% corn silage and formulated for 17.1±0.4% CP and 30.5±1.7% NDF (DM basis).

Treatments

- **Control** – TMR
- **Optigen®** – TMR with 114 g/cow/d Optigen® replacing an equivalent amount of supplemental CP, primarily from SBM.
- Treatments were isonitrogenous.
- Diet formulation space created by Optigen® was filled with DM from either corn silage, high moisture corn and corn grain.

Measurements

- Weight and composition (fat, protein, MUN) of bulk tank milk shipments per herd were recorded.
- Number of cows with milk in the bulk tank per shipment was recorded.
- Average daily milk yield and milk component yields were calculated.
- A spreadsheet economic simulation was performed using the Optigen® feeding rate and milk yield response from the field trial and monthly (as-fed) prices for SBM-48 (\$0.373±0.054/kg), dry corn (\$0.188 ±0.020/kg), corn silage (\$0.059±0.005/kg), and high-moisture corn (\$0.149 ±0.016/kg) and milk prices (\$0.38±0.03/kg) for January – December, 2008. Local pricing for Optigen® (\$1.63/kg) was used. A total of 32 combinations of varying feed and milk prices were simulated.

Data analysis

- Dairy herd was the experimental unit.
- Mixed model procedure of SAS with period, sequence and treatment as fixed effects and herd as a random effect.

Objectives

To determine the effect of Optigen® (blended, controlled-release urea), as a source of dietary nonprotein nitrogen on milk production, milk composition, and economics in commercial dairy herds in Wisconsin.

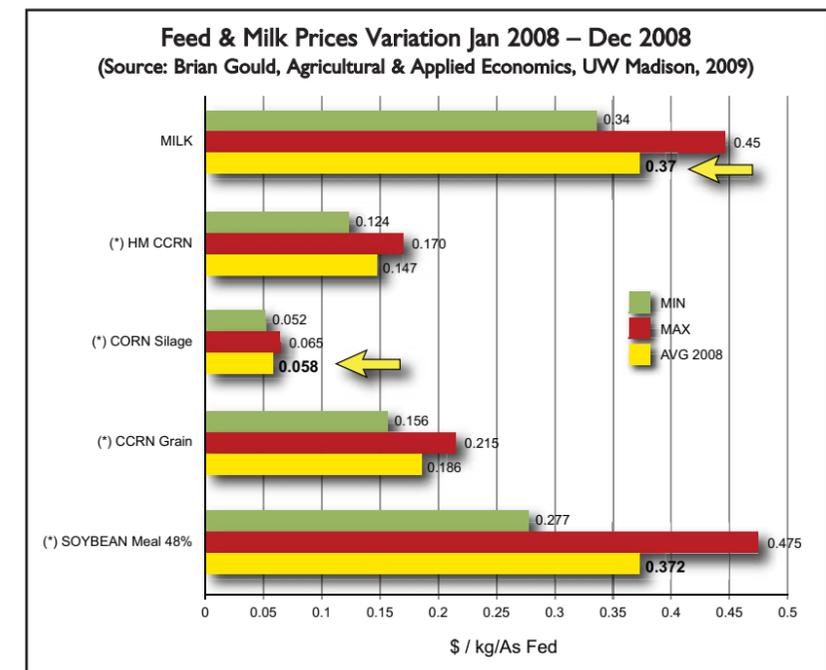
Table 1. Milk production and milk composition in response to Optigen®.

	Control	Optigen®	SEM	P-Value
Milk yield, kg/d	35.4	35.9	0.2	0.01
Fat, %	3.72	3.69	0.02	0.07
yield, g/d	1317	1322	8	NS
Protein, %	2.98	2.97	0.01	NS
yield, g/d	1055	1065	6	0.13
MUN, mg/dL	12.4	13.2	0.3	0.01

Optigen® Evaluator Tool			
1 INPUT DATA			
1.1	Optigen®	As Fed kg/cow/d	Price \$/kg
		0.114	1.630
Input data			
	Milk Price		
	SBM price		0.373
	Corn Silage price		0.059
	Optigen® price		
1.4	Milk Increase/Decrease because use of Optigen®	kg/cow/d	
		0.500	
Analysis			
1.5	Milk Price		\$/cwt
	Feed Cost		18.00
	Milk Income		
	Value of Use		
2 ANALYSIS			
	Amount	Value	
	kg DM	\$/cow/d	
2.1	Optigen®	0.113	-0.186
2.2	SOYBEANMeal, solvent, 48% CP	-0.752	0.313
2.3	CORN, YELLOWSilage, normal 32-38% DM	0.639	-0.107
2.4	Value of change in milk production		0.198
Value of Using Optigen®			
2.6			\$/cow/d
			0.218

Results

- Milk yield was 0.5 kg/d/cow greater (P<0.01) for Optigen® compared with the control (Table 1).
- Optigen® reduced feed cost only when corn silage was used to fill the formulation space. However, milk income minus feed cost was increased by Optigen® for all forms of dry corn used to fill the formulation space. This difference was greatest for the corn silage treatment at \$0.21/cow/d.
- A decision tool spreadsheet was developed to allow additional economic simulations. The tool allowed for varying the following: milk yield response to Optigen®, cost of Optigen®, and the CP and energy supplements evaluated (Table 2).



Conclusions

- Under the conditions of this study, Optigen® reduced feed cost when corn silage was used to fill the formulation space, however milk income minus feed cost was increased by Optigen® for all forms of corn used.
- A decision tool spreadsheet was developed to help producers, consultants, and extension agents compare and select feed supplements in diets of lactating cows.

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Table 2. Economic impact of Optigen® use in dairy herd diets.

Crude protein supplement replaced by Optigen®	Ingredient used to fill formulation space	Feed cost OPT - CON (\$/cow/d)	Milk income OPT - CON (\$/cow/d)	Milk income minus feed cost (\$/cow/d)
SBM-48	Dry corn	0.047 (± 0.027)	0.192 (± 0.016)	0.145 (± 0.039)
SBM-48	Corn silage	-0.020 (± 0.039)	0.192 (± 0.016)	0.212 (± 0.051)
SBM-48	High-moisture corn	0.042 (± 0.028)	0.192 (± 0.016)	0.150 (± 0.040)