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CURC 852: Effects of dietary Protect D supplementation on milk production performance in Lactating Cows: A pilot study.

Project Scope

The present study was developed in dairy cows: the hypothesis is that dietary supplementation of Protect D enhances production performance of lactating dairy cattle relative to cows non supplemented with Protect D.

Study Design

- Controlled fixed period study.
- Ninety-sixty lactating Holstein dairy cows were enrolled in a study at the Cornell University Dairy Research Center (CURC) in Dryden, NY. Cows were balanced into one of six free stall pens (16 cows/pen; 3 pens/treatment; Barn 3, n = 48 cows/treatment, balanced by weekly milk average, days in milk and lactation number). The six pens were randomly assigned into two treatment groups (three pens/trt).
- 21-day acclimation period, all cows received a conventional total mixed ration (TMR) typically provided to the High production group cows at CURC, which was unsupplemented with Protect D (ProAgni)
- 42-day experimental period, three pens continued on the unsupplemented (Control) TMR, with the remaining three pens receiving TMR supplemented with Protect D
- The "Control TMR" was the current "high cow" diet fed to cows in Barn 3, but without the inclusion of monensin.
- 12 multi- and 4 primiparous cows assigned to each of six pens

Data collection

- Body Weights
- DMI, Milk and Efficiency
- Milk yield, composition, MUN, SCC

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Diet

The Control TMR was the current "high cow" diet fed to cows in Barn 3 of the Cornell University Dairy Research Center (CURC) in Dryden, NY, but without the inclusion of monensin.

Ration formulations and ingredient composition are listed in Tables 1 and 2. A supplement pack was created for the Control TMR which was the same quantity as Protect D and a chemical analysis for the Protect D supplement mixture. All other TMR ingredients remained the same for both diets.

Table 1. TMR Ingredient Composition

Ingredient, DM kg/Cow/d	Control	Protect D
Corn Silage	13.72	13.72
Triticale Silage	1.13	1.13
HCS	2.50	2.50
HMSC	2.56	2.55
Corn Meal	2.35	2.34
Soybean Meal	1.97	1.97
High Lac 10133	3.73	0.00
ProAgni Hi 11013v2	0.00	3.75
Total Ration DM, kg	27.95	27.95
Ration formulation conducted by Cargill, 11/1/2023		
Control: Hi Lac 10133v2	Protect D: Hi ProAgni	

Table 2. TMR Formulated Nutrient Composition

	Experimental Diet Formulations	
Nutrient, DM Conc	Control	Protect D
Forage Products %	62.07	62.07
Fat %	3.65	3.63
Crude Protein %	16.21	16.12
RDP %	10.29	10.28
NPN CP Eqv %	0.85	0.85
DDAA Lys g/kg	8.54	8.89
DDAA Met g/kg	3.04	3.32
DDAA His g/kg	3.2	3.19
Hydroxy Meth Analog g/kg	0	0.68
Nel Dairy mcal/cwt	75.88	75.55
NFC %	46.16	45.99
Rumen Sol Sugar %	3.27	3.25
Adj Tot Starch %	27.63	27.53
Organic Acid %	6.87	6.87
NDF %	27.98	27.83
Digestible NDF %	13.06	12.97
DigNDF/NDF ratio	0.47	0.47
uNDF 240,%	7.1	7.05
peNDF %	21.33	21.33
peuNDF240 %	5.8	5.8
rH Index unit	-0.08	-0.28
Calcium %	0.8	0.85
Phosphorus %	0.33	0.36
Sulfur %	0.23	0.23
Magnesium %	0.28	0.27
Potassium %	1.31	1.51
Sodium %	0.45	0.34
Chloride %	0.4	0.76
Added Salt %	0.4	0.4
DCAD meq/100g	27.82	17.87
Copper mg/kg	14.99	18.78
Manganese mg/kg	74.08	60.72
Cobalt mg/kg	1.48	0.78
Iodine mg/kg	0.95	0.77
Zinc mg/kg	87.4	70.9
Added Se mg/kg	0.3	0.3
Vitamin A IU/g	5.5	5.27
Vitamin D IU/g	1.01	1.01
Vitamin E iu/kg	26.04	60.76
Ration Chemical Composition provided by Cargill, 11/1/2023		
Balanced for 681 kg Bwt, 115 DIM, 42.2 kg Milk, 4.25% Milk Fat, 3.35% Protein		
	Control: Hi Lac 10133	Protect D: Hi ProAgni

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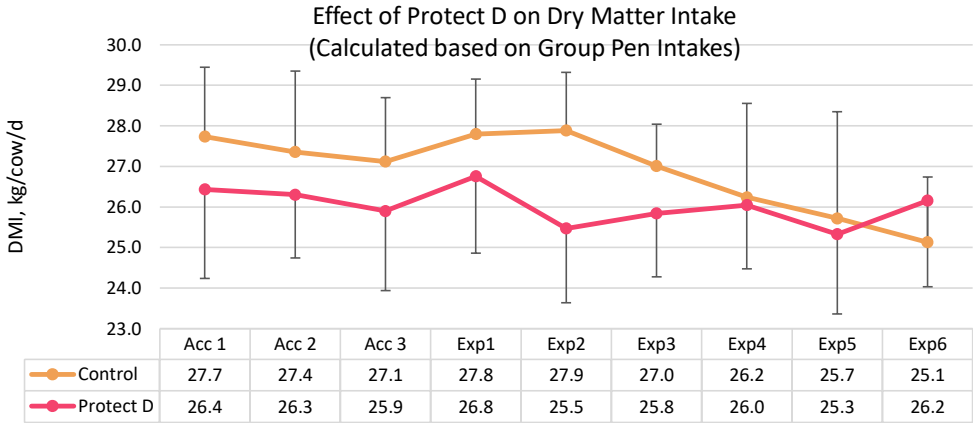
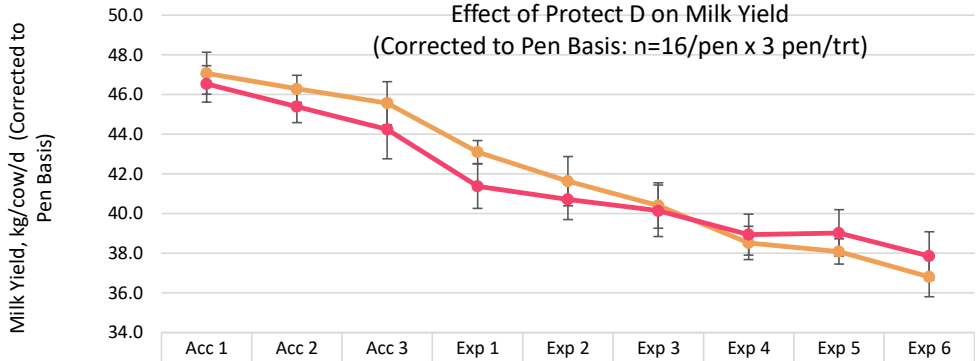
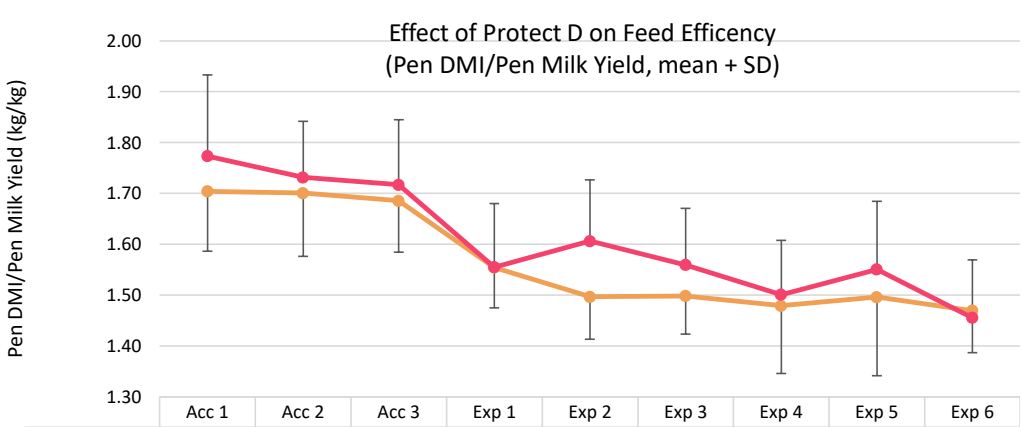
PROTECT D V CORNELL HIGH COW
DMI, MILK AND EFFICIENCY



	Acc 1	Acc 2	Acc 3	Exp1	Exp2	Exp3	Exp4	Exp5	Exp6
Control	27.7	27.4	27.1	27.8	27.9	27.0	26.2	25.7	25.1
Protect D	26.4	26.3	25.9	26.8	25.5	25.8	26.0	25.3	26.2



	Acc 1	Acc 2	Acc 3	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6
Control	47.1	46.3	45.6	43.1	41.6	40.4	38.5	38.1	36.8
Protect D	46.5	45.4	44.2	41.4	40.7	40.1	38.9	39.0	37.9



	Acc 1	Acc 2	Acc 3	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6
Control	1.70	1.70	1.69	1.55	1.50	1.50	1.48	1.50	1.47
Protect D	1.8	1.73	1.72	1.55	1.61	1.56	1.50	1.55	1.46

Feed Efficiency was statistically better with ProTect D

- Group pen DMI were higher (P=0.01) for Control v ProTect D fed cows during the experimental period. (Control animals ate more)
- Cows receiving ProTect D supplementation had higher (P=0.001) milk yields than Control Cows during the experimental period.
- Feed efficiencies (MY/DMI) during the acclimation period were higher (P=0.04) for ProTect D supplemented cows than Control.
- This same pattern was extended into the Experimental period, however, to a more significant degree (P=0.005).

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PROTECT D V CORNELL HIGH COW
MILK COMPOSITION

Figure 8. Effect of Protect D on Milk Yield
(Milk Yields Associated with Milk Sampling Period)

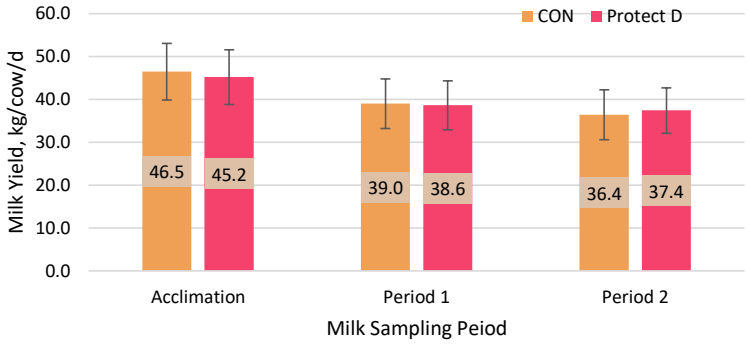
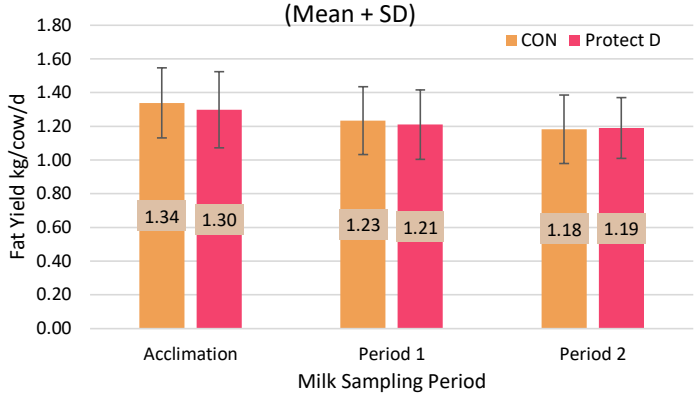


Figure 10. Effect of Protect D on Fat Yield,
(Mean + SD)



Milk Yield and Quality was better with ProTect D

- ✓ Cows receiving ProTect D supplementation had higher (P=0.001) milk yields than Control Cows during the experimental period.
- ✓ Fat yield was higher (P=0.05) for period 2 for cows supplemented with Protect D.
- ✓ Protein yield was statistically higher (P=0.03) for cows supplemented with ProTect D.
- ✓ Lactose yield was statistically higher (P=0.01) for cows supplemented with ProTect D.

Figure 12. Effect of Protect D on Protein Yield
(Mean + SD)

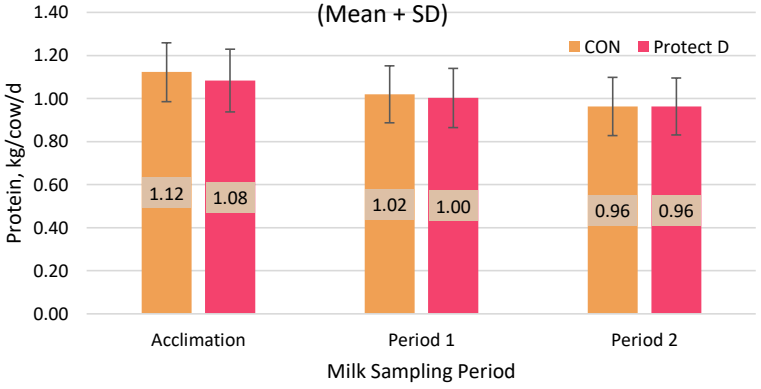
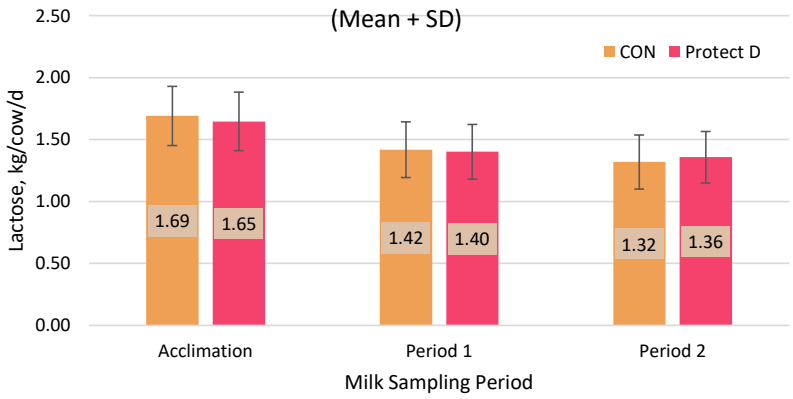


Figure 14, Effect of Protect D on Lactose Yield
(Mean + SD)



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PROTECT D V CORNELL HIGH COW
MILK COMPOSITION

Figure 16. Effect of Protect D on Total Solids Yield (Mean + SD)

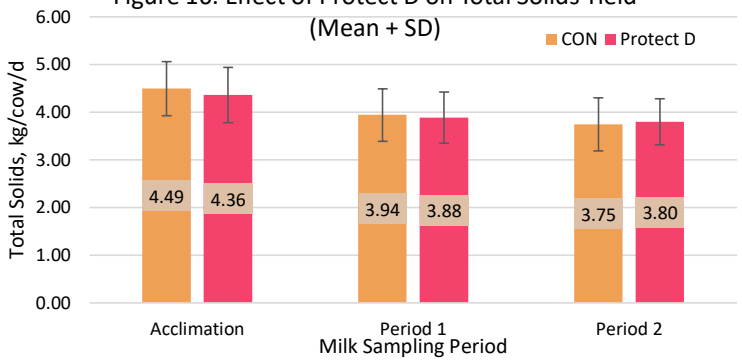
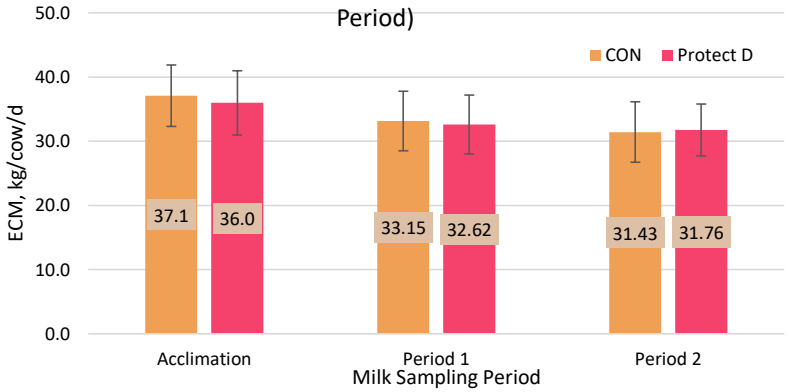


Figure 17. Effect of Protect D on ECM Yield, (Mean + SD) (Calculated From MY Associted with the Milk Sampling Period)



Milk Yield and Quality was better with ProTect D

- ✓ Total Solids was statistically higher (P=0.01) for cows supplemented with ProTect D.
- ✓ Energy corrected milk (ECM) yields were higher (P=0.02) for cows supplemented with ProTect D.
- ✓ Milk urea nitrogen (MUN) was higher (P=0.001) for cows supplemented with Protect D.
- ✓ Somatic cell count were lower (P=0.05) for cows supplemented with ProTect D.

Figure 18. Effect of Protect D on MUN (LS Mean + SD)

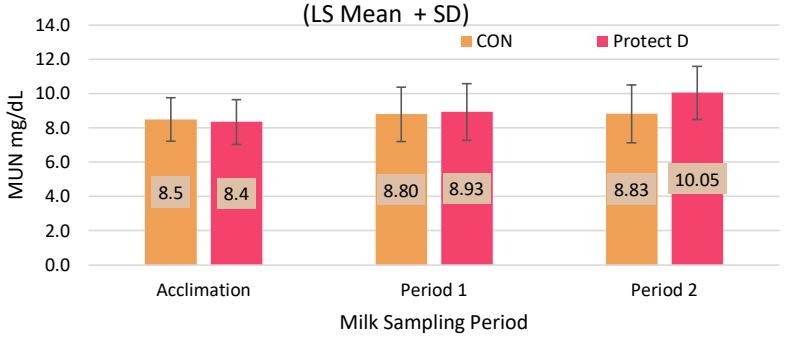
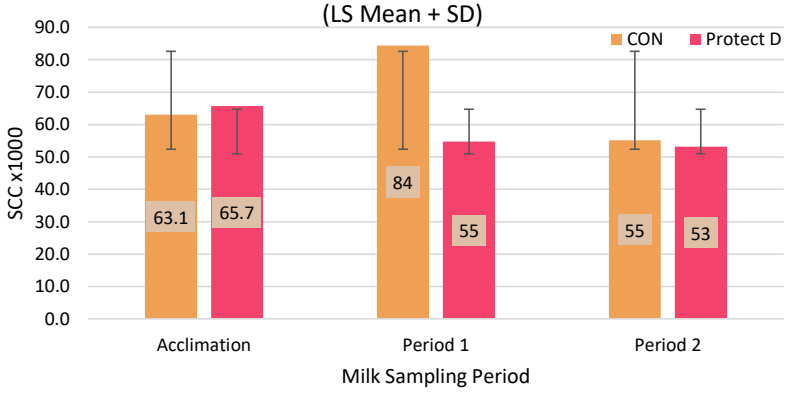


Figure 19. Effect of Protect D on SCC (LS Mean + SD)



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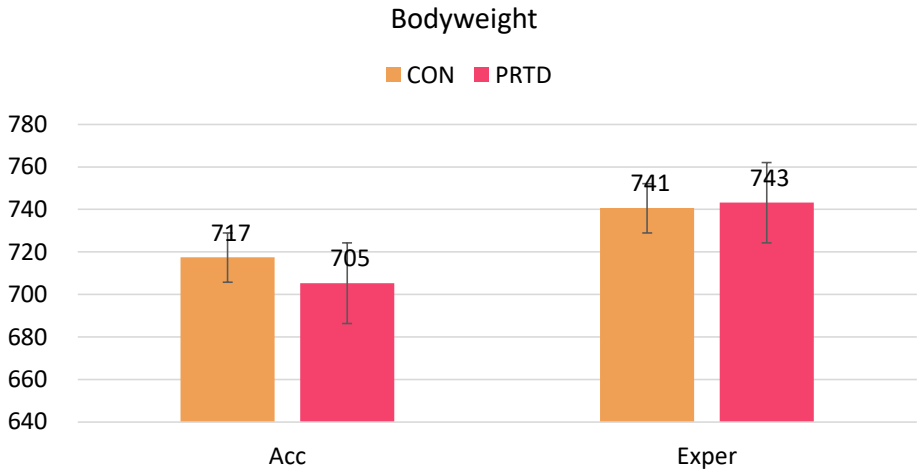
PROTECT D V CORNELL HIGH COW
BODYWEIGHT & SUMMARY



Weight

- There was no effect (P>0.05) of treatment on body weight, with both groups gaining weight during lactation.
- Control animals put on 23.2kg during the pilot and the ProTect D animals put on 37.9kg (368grams/day Control v 600grams/day ProTect D)

SUMMARY

There was a reduction in DMI with Protect D supplementation, however, an overall increase in milk production, which resulted in increased efficiency (MY/DMI).

The transition from product introduction to response was within a reasonable timeframe (2 wk) from both a physiological and potentially measurable response.

Milk composition results supported a positive ECM response, from the Protect D supplementation.

This data suggest there is a potential benefit to the inclusion of Protect D in a dairy ration.

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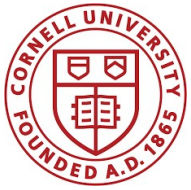

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