



Evaluation of Celmanax[®] SCP on Lactational Performance and Ruminal Fermentation of Holstein Dairy Cows Fed Corn Silage Based Diets with a Moderate Starch Content

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<http://whminer.org/adsa2014.html>

INTRODUCTION

- Yeast and yeast products have been fed to dairy cows to modify ruminal fermentation and positively affect lactational performance
- Celmanax Soluble Concentrate Powder (SCP) is an ultra concentrated combination of yeast culture and hydrolyzed yeast cell wall derived from *Saccharomyces cerevisiae*

OBJECTIVE

- To evaluate the effect of dietary supplementation of yeast culture plus enzymatically hydrolyzed yeast cell wall on the lactational performance and ruminal fermentation of Holstein cows

MATERIALS & METHODS

Experimental Design

- Randomized complete block design with a 14-d covariate period and a 28-d treatment period
- 21 primiparous and 39 multiparous (15 ruminally cannulated) lactating Holstein cows
 - 123 ± 28 (SD) days in milk at start of covariate period
- Housed in freestalls, fed individually 1x/d, and milked 3x/d

Dietary Treatments

- Corn silage based diet supplemented with 0, 3, or 5 g of Celmanax[®] SCP/d (Vi-COR[®], Inc., Mason City, IA)

Data Collection

- Intake and milk yield measured daily during covariate period and wk 3 and 4 of treatment period

- Milk composition measured weekly during covariate period and wk 3 and 4 of treatment period
- Ruminal pH (72-h period) and ruminal volatile fatty acids (24-h period) measured during wk 2 of the covariate period and wk 4 of the treatment period

Statistical Analysis

- Repeated measures data from the covariate period and wk 3 and 4 of the treatment period were reduced to period means for each cow
- ANOVA with MIXED procedure of SAS
- Least square means were adjusted using data from the covariate period

RESULTS

Table 1. Ingredients, chemical composition, and digestibility of diet

Item	
Ingredients, % of ration DM	
Brown midrib corn silage	30.75
Conventional corn silage	16.18
Haycrop silage	9.71
Corn meal	8.91
Soybean meal	7.28
Soybean hulls	3.24
Wheat middlings	2.83
Corn gluten feed	2.43
Canola meal	4.05
Corn germ meal	3.24
Blood meal	1.94
Bakery byproduct	1.90
Rumen inert fat	1.50
Other	6.03
Analyses	
CP, %	16.4 ± 0.1
ADF, %	21.3 ± 0.3
NDR, %	36.3 ± 0.4
aNDF, %	33.5 ± 0.3
AD lignin, %	2.5 ± 0.1
peNDF, %	21.9 ± 0.3
Starch, %	24.2 ± 0.4
Sugar, %	6.0 ± 0.2
Fat, %	3.8 ± 0.1
24-h aNDF digestibility, % aNDF	55.9 ± 0.5

Table 2. Performance data

Item	Celmanax SCP, g/d			SE	P-value	
	0	3	5		Linear	Quadratic
DMI, kg/d	27.4	27.1	27.4	0.2	0.87	0.20
DMI, % of BW/d	3.96	3.96	3.97	0.03	0.82	0.96
Yeast intake, g/d	0	2.8	4.9	0.1	<0.01	0.44
Milk, kg/d	45.3	45.9	45.4	0.4	0.82	0.36
SCM, kg/d	44.8	45.4	44.6	0.6	0.94	0.28
Fat, %	3.88	3.90	3.86	0.05	0.78	0.54
Fat, kg/d	1.71	1.77	1.71	0.03	0.84	0.19
True protein, %	3.23	3.20	3.20	0.02	0.35	0.69
True protein, kg/d	1.44	1.45	1.42	0.02	0.58	0.43
Somatic cell score	1.44	1.21	1.46	0.18	0.94	0.27

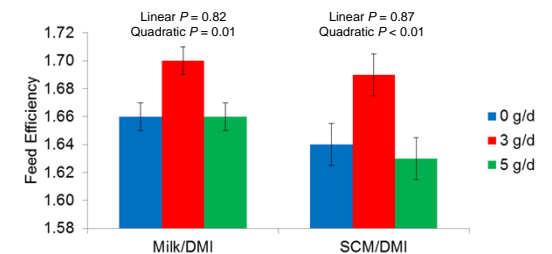


Figure 1. Feed efficiency data

Table 3. Ruminal fermentation data

Item	Celmanax SCP, g/d			SE	P-value	
	0	3	5		Linear	Quadratic
Mean pH	6.11	6.02	6.03	0.08	0.38	0.70
Standard deviation pH	0.25	0.26	0.30	0.03	0.24	0.57
Time pH <5.8, min/d	233	388	303	125	0.59	0.52
Time pH <5.5, min/d	34	139	125	66	0.27	0.58
Total VFA, mM	128.6	138.2	141.9	3.7	0.01	0.72
Acetate, mM	71.0	76.2	79.9	2.0	<0.01	0.94
Propionate, mM	27.0	29.9	29.4	1.3	0.17	0.37
Butyrate, mM	13.6	15.0	16.3	0.8	0.02	0.83
Acetate:Propionate	2.7	2.7	2.8	0.1	0.39	0.42
NH ₃ , mg/dL	7.7	9.4	10.2	1.0	0.10	0.89

CONCLUSIONS

- Supplementation of 3 g/d of Celmanax[®] SCP in a corn silage based diet with moderate starch improved feed efficiency potentially through changes in ruminal fermentation