

**NOTE**  
**EFFECTS OF YEAST CULTURE SUPPLEMENTATION OF  
ALFALFA SILAGE OR ALFALFA HAY FED TO  
LACTATING DAIRY COWS**

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**ABSTRACT**

In a completely randomized design, 24 lactating Holstein cows were assigned to a 2x2 factorial arrangement to compare the effect of supplementing yeast culture (YC, Yea-Sacc, Alltech, Inc.) added to different types of forages (silage or hay). Treatments were: A) silage with YC, B) silage without YC, C) hay with YC and D) hay without YC. Average daily feed intake, weekly body weight, milk yield, milk protein and milk fat were measured. Body weight was not influenced by treatments. YC did not affect milk yield, milk composition and feed intake.

**KEY WORDS:** Alfalfa, Dairy cow, Silage, Yeast.

**تحقیقات کشاورزی ایران**

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**اثر اضافه کردن مکمل مخمر به سیلو یا علوفه خشک یونجه در تغذیه**

**گاو های شیر ده**

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### چکیده

در یک طرح بلوک کاملاً تصادفی، ۲۴ گاو شیرده هولشتین در یک ترتیب فاکتوریل ۲×۲ برای مقایسه اثر اضافه کردن مکمل مخمر به سیلوی یونجه یا علوفه خشک یونجه اختصاص یافتند. تیمار ها عبارت بودند از: ۱- سیلوی یونجه با مخمر ۲- سیلوی یونجه بدون مخمر ۳- علوفه یونجه با مخمر ۴- علوفه یونجه بدون مخمر. میانگین خوراک روزانه، وزن هفتگی، میزان تولید شیر، درصد و مقدار تولید پروتئین و چربی شیر در هر چهار گروه اندازه گیری شد. جیره های غذایی مخالف اثر معنی داری بر وزن گاو ها نداشتند. مخمر اثری بر تولید و ترکیب شیر و مقدار خوراک مصرفی نداشت.

### INTRODUCTION

Studies have shown that yeast culture (YC) supplementation to diets of ruminants could influence production performances, however, the results were variable. Wiedmeier *et al.* (12) reported stimulatory effects of YC supplementation on cellulolytic and proteolytic bacterial concentration in ruminants. A study with lambs (7) has indicated better growth of lambs when YC was fed with hay rather than silage. However, these results have not been consistent in all studies (2).

The objective of this study was to determine the effect of YC supplementation to alfalfa silage or hay in lactating dairy cows.

### MATERIALS AND METHODS

Twenty four mid-lactating Holstein cows were assigned to a 2 × 2 factorial treatment arrangement in a randomized block design (with six replications per treatment) for 14 wk. Treatment diets were: a) silage with YC, b) silage without YC, c) hay with YC and d) hay without YC.

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The concentrate mixture used is shown in Table 1. Ingredient, composition and chemical analysis of experimental diets (Table 2) were determined according to the methods of the AOAC (3). Yeast culture (10-12 g head<sup>-1</sup> d<sup>-1</sup>) or placebo was added on top of concentrate each morning. Dry matter content of alfalfa and silage was measured by toluene distillation method (4).

Table 1. Concentrate mixture of feed fed to dairy cows.

Ingredient composition	% DM
Corn meal	28.20
Hominy feed	25.00
48% soybean meal	19.10
Distillers dried grain	15.00
Wheat middlings	5.00
Molasses-fat-prop/phosphonic acid	2.00
Fat-feed grade	1.00
Sodium sesquicarbonate	1.50
Ground limestone	1.00
Dicalcium phosphate	1.00
Potassium/magnesium sulfate	0.50
Salt	0.50
Vitamin A, D3, E and selenium	0.20

Manufactured by: Southern States Coop., Inc. Winchester, KY 40391, U.S.A.

Table 2. Ingredient composition and chemical analysis of experimental diets.

Item	Diets (% DM basis)			
	Silage with yeast	Silage without yeast	Hay with yeast	Hay without yeast
<b>Ingredient</b>				
Alfalfa	50.0	50.0	50.0	50.0
Concentrate	50.0	50.0	50.0	50.0
<b>Chemical analysis</b>				
Crude protein	20.2	20.2	18.2	18.2
ADF	21.5	21.5	22.0	22.0
NDF	32.9	32.9	33.2	33.2
Calcium	1.28	1.28	1.25	1.25
Phosphorus	0.61	0.61	0.57	0.57
Magnesium	0.27	0.27	0.27	0.27
Potassium	2.26	2.26	1.65	1.65
Sodium	0.63	0.63	0.62	0.62
Iron (ppm)	600	600	275	275
Zinc (ppm)	82.0	82.0	77.0	77.0
Copper (ppm)	17.0	17.0	17.0	17.0
Manganese (ppm)	105	105	72.0	72.0
Molybdenum (ppm)	2.65	2.65	2.35	2.35

Average daily feed intake (DMI), weekly body weight (BW), milk yield, milk protein and milk fat were statistically analyzed by using analysis of covariance. When F values were significant, differences between means were identified by the least significant difference method (11).

### RESULTS AND DISCUSSION

The overall means of DMI (Table 3) were different among treatment groups. Cows fed hay (with or without YC) had higher ( $P<0.01$ ) dry matter intake than cows fed silage (Fig. 1). When data were pooled for the effects of yeast and feeding regimen, the addition of yeast had no effect on feed intake, but cows consumed significantly ( $P<0.01$ ) more hay than silage. Other studies (1, 3, 5, 8, 9, 10) have also shown no effects of YC on feed intake.

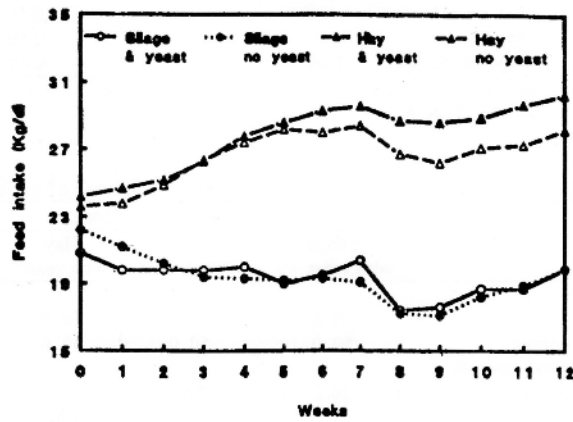


Fig. 1. The effect of dietary supplementation of yeast culture and forage-types on dry matter feed intake of lactating cows.

The overall means of body weight were not significantly different for any treatment groups. Cows fed alfalfa hay tended to have higher body weights than cows fed silage.

*Effects of yeast culture supplementation...*

The overall means of milk yield (Table 3) for different treatment groups were higher ( $P < 0.01$ ) for those cows fed alfalfa hay with or without YC (Fig. 2). These differences were due to forage type, not the yeast effects. Other studies (2, 8) also did not show any significant effect of YC supplementation on milk yield of dairy cows. In one study (6) a 6% increase in milk yield for high producing dairy cows supplemented with YC was observed, but there were no effects of YC supplementation on low producing cows.

Table 3. Effects of yeast culture (YC) supplementation in the dairy cow diet on the least square means of feed intake (DMI), body weight (BW), milk yield (milk), milk fat percentage, milk fat yield (Mfat), milk protein percentage (Mpro%) and milk protein yield (Mpro  $\text{kg d}^{-1}$ ).

Treatments		DMI $\text{kg d}^{-1}$	BW kg	Milk $\text{kg d}^{-1}$	Milk %	Mfat $\text{kg d}^{-1}$	Mpro %	Mpro $\text{kg d}^{-1}$
Forage	YC							
Silage	Yes	18.7 <sup>b</sup>	515 <sup>a</sup>	27.2 <sup>b</sup>	3.23 <sup>c</sup>	0.84 <sup>a</sup>	3.07 <sup>a</sup>	0.82 <sup>c</sup>
Silage	No	17.8 <sup>b</sup>	510 <sup>a</sup>	27.6 <sup>b</sup>	3.24 <sup>c</sup>	0.89 <sup>a</sup>	3.08 <sup>a</sup>	0.84 <sup>cd</sup>
Hay	Yes	24.1 <sup>a</sup>	526 <sup>a</sup>	30.7 <sup>a</sup>	2.83 <sup>f</sup>	0.85 <sup>a</sup>	3.18 <sup>a</sup>	0.96 <sup>d</sup>
Hay	No	24.4 <sup>a</sup>	518 <sup>a</sup>	30.3 <sup>a</sup>	3.00 <sup>fe</sup>	0.87 <sup>a</sup>	3.12 <sup>a</sup>	0.91 <sup>cd</sup>

a,b. Means with different superscript within the same column differ ( $P < 0.01$ ).

c,d. Means with different superscript within the same column differ ( $P < 0.05$ ).

e,f. Means with different superscript within the same column differ ( $P < 0.10$ ).

The overall means of milk fat percentage in different treatment groups were lower only at significant level of  $P < 0.10$  for cows fed alfalfa hay. These differences were due to forage type not to feeding yeast.

Overall means of milk fat yield were not significantly different between treatment groups; YC and forage types had no effect on milk fat yield.

Overall means of milk protein percentage were not different between treatment groups. However, cows fed hay with or without YC tended to have higher milk protein percentages than cows fed silage (Table 3). These differences were due to feeding different forage types. This is in agreement with the results of our previous study (1) in which, no significant effects of

YC supplementation on milk protein percentage of dairy cows were observed.

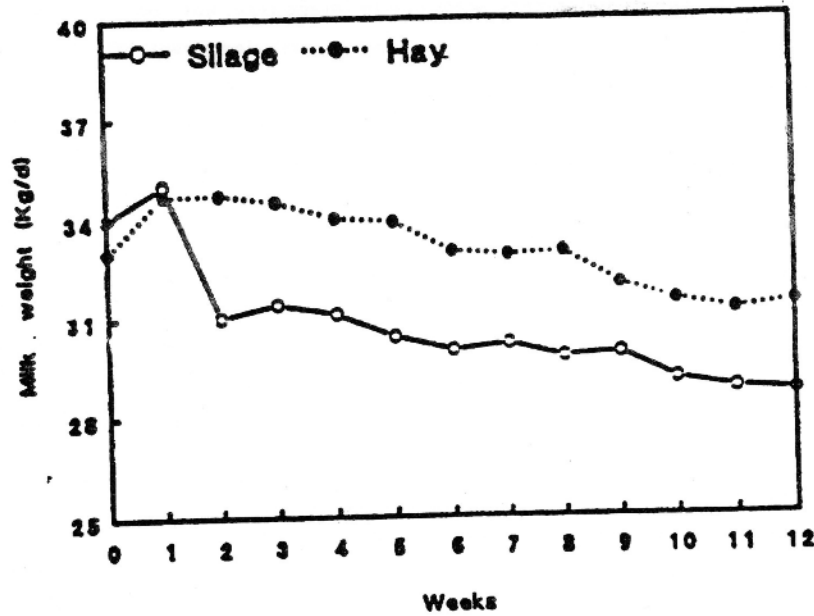


Fig. 2. Effects of different types of forages on milk weight of lactating feeding cows.

Overall means of protein yield were higher ( $P < 0.05$ ) in cows fed hay than cows fed silage (Fig. 3). These effects were due to forage type rather than YC effects.

### CONCLUSIONS

1. There was no effect of YC supplementation on feed intake, body weight, milk and milk composition of dairy cows.
2. Cows fed alfalfa hay had significantly higher milk yield, feed intake and milk protein weight and tended to have higher body weight and milk protein percentage than cows fed alfalfa silage. Cows fed alfalfa hay had significantly lower milk fat percentage than cows fed silage.

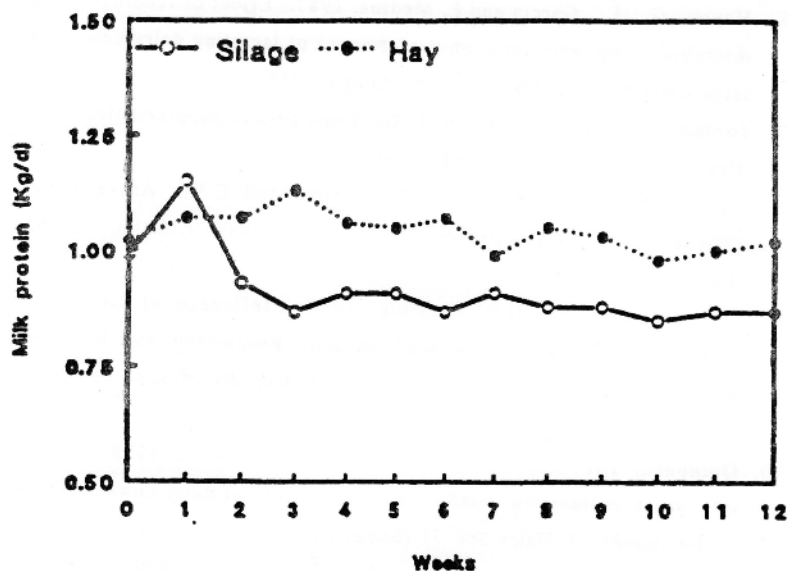


Fig. 3. Effect of feeding different types of forages on milk protein yield of lactating cows.

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