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SHORT COMMUNICATION:

Performance of Dairy Cows Fed Two Level of Concentrate During Late Lactation

Ghaleb A. Alhadrami[1] and John T. Huber[2]

1 Department of Animal Production, Faculty of Agricultural Sciences, U.A.E. University, P.O. Box 17555, Al-Ain, United Arab Emirates.
2 Department of Animal Science, University of Arizona, Tucson, AZ. 85721, U.S.A.

ABSTRACT :

Thirty-two Holstein cows in late lactation were used in a 41-d production trial. Cows were paired by production level based on a 14-d pre-treatment period. Treatments consisted of: 1) low concentrate (75% alfalfa hay and 25% concentrate); 2) high concentrate (50% alfalfa hay and 50% concentrate). Dry matter intake, milk production, 3.5% FCM, milk composition, changes in body weight and body condition were not affected by diets varying widely in concentrate levels.

Key words : Lactating cows, concentrate, alfalfa hay.

INTRODUCTION

Feeding concentrates in the diet of dairy cows up to 60% of total DM increases milk yield in early lactation (Broster et al., 1978). Competition for cereal grains between humans and cattle may influence future feeding practices. An alternative to feeding large amounts of concentrates may be increased feeding of high qulity forages (Depeters and Kesler, 1980). Depeters and Kesler (1980) found no difference in dry matter intake, milk yield, milk components, or changes in body weight, when concentrates were partially replacedby high quality hay in lactating cow diets.

In another study Depeters and Smith (1986) reported that forage quality and concentrate levels (30 or 50%) did not affect milk yield or dry matter intake. However, milk fat percentag was reduced by higher concentrates level (3.7 vs 3.3%). Solorzano et al. (1989) reported numerically greater yiels of milk, FCMand milk components, with increasing energy supplementation to rotationally-grazed dairy cows, but no differences ($P > .13$) in the concentration of milk components or changes in body weight or condition were detected. The objective of this experiment is to determine the effect of two concentrate levels on the performance of late lactating cows.

MATERIALS AND METHODS

Thirty-two late-lactating Holstein cows (220 days in milk) were used in a 41 d production trial. Cows were adapted to experimental pens for 1 wk followed by a 14-d per-treatment period. This was to randomly pair cows according to milk production. Treatments were: 1) low concentrates, consisting of 75% alfalfa hay and 25% concentrate; 2) high concentrates, consisting of 50% alfalfa hay and 50% concentrate. Alfalfa hay (mid-bloom) was the only forage, and concentrates were comprised of commercial herd grain mix plus 11% whole cotton seed. Hay was sampled from 20 randomly selected bales using the Pennsylvania State University core-sampling technique. While concentrate (grain plus cotton seed) was sampled from both diets prior to feeding. Samples were kept frozen at -5C until analyzed for DM, CP, ADF, lignin, cellulose and ash.

Hay and concentrate samples were ground in a Wiley mill fitted with a 2 mm screen. Dry matter, total ash and nitrogen contents were determined for all samples according to AOAC (1980), and NDF, ADF, lignin and cellulose by procedures of Van Soest and Robertson (1986).

Cow were fed individually ad libitum using Calan gates (American Calan Inc., Norwood, NH) with free access to water and trace minerlized salt blocks. Hay and concentrates were fed separately. All the hay and half the daily allotment of concentrates were offered 2h before the p.m. milking (1700 h) and the remaining concentrate immediately after the a.m. milking (0500 h). Amount of feed was adjusted daily to allow for 5-10% orts weighed(weigh tback) just before the p.m. feeding. Milk yields were recorded for every milking and milk samples (am and pm) were collected one day each week, composited and analyzed at the Arizona DHIA laboratory for

fat, protein, lactose and solids-non fat according to infrared procedures. Cows weres weighed twice at the beginning and at the end of treatment and at bi-weekly intervals during treatment. Also, body condition scores were estimated by-weekly on a scale of 1 to 5 (Wildman, 1979) just prior to weighing. Statistical analyses were conducted using paired t-test for the model : $Yij = U + Ti + Bj + Eijk$. This model accounts for treatment (Ti), block (Bj) and random error (Eijk) effects.

RESULTS AND DISCUSSION

Compositional analysis of alfalfa and concentrate are presented in Table 1. Calculated CP percent was 17.0 and 15.9% for low and high concentrate diets, respectively, and considered sufficient for late-lactation cows producing under 25 kg/d (Reid, 1975). Performance of cows is summarized in (Table 2). Pre-treatment milk yields were similar for treatment groups. During treatment, cows fed the high concentrate diet produced slightly more milk and FCM than those fed low concentrate but difference were not significant ($P < .05$). Similarly, milk fat percentage, milk protein, milk lactose and solid-non-fat (Table 2) did not differ ($P > .05$) between treatments.

Intake of DM for cows on high concentrate was slightly higher, but differences were not significant ($P > .05$) and feed efficiency was similar for both treatments. Similar resuts were reported by Solorzano et al. (1989) who found numerical increases, with no significant differences, in the yield of milk and milk components by increasing energy supplementation to rotationally grazed cows. Depeters and Smith (1986) reported that diets containing 30 ro 50 concentrate did not affect milk yield or DM intake of dairy cows during the first 14 wks of lactation, although milk fat percent was reduced by higher concentrate.

Cows on low concentrate had final negative body weight changes, while high concentrate resulted in increased weight, but treatment differences were small ($P > .05$). Final body condition score changes were similar for both treatments which agrees with Solorzano et al. (1989) who found that doubling the level of concentrate for grazing dairy cows did not significantly affect body weight or body condition scores.

These data show that level of concentrate can be about 25% of the DM for late-lactation cows without decreasing performance as

Table 2: Effect of high VS. low concentrate on cows' performance and milk composition[1]

	High Conc.	Low Conc.	SEM
Performance			
Pretreatment milk (kg/d)	24.4	23.9	
Treatment milk (kg/d)	20.0	19.2	1.30
FCM production (kg/d)	21.0	19.9	0.64
DM intake (kg/d)	21.3	20.5	1.80
DM intake (% of BW)	3.2	3.1	0.08
Milk/Feed (kg)	.94	.94	0.05
Milk Composition[2] (%)			
Milk fat	3.92	3.79	.45
Protein	3.45	3.34	.20
Lactose	4.88	4.69	.13
SNF	9.02	8.72	.28

[1] None of the differences was significant (P<.05).
[2]Each value is the mean of four observations.

Table 1. Chemical composition of alfalfa hay and concentrates.

	Alfalfa hay[2]	Cottonseed + Concentrate fed[1]	
		High Conc.	Low Conc.
	----------% DM ----------		
CP	17.1	14.7	16.8
ADF	29.9	17.6	21.9
NDF	38.0	30.1	33.7
Lignin	10.2	5.0	5.7
Cellulose	20.8	10.7	15.0
Ash	9.5	7.2	6.8

[1] Mean of four observations.
[2] Mean of eight analyses form 20-bale composite.

long as good quality alfalfa hay is the forage source.

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أداء أبقار الحليب المغذاة على مستويين من المركزات في المرحلة المتقدمة من موسم الإدرار

غالب ع . الحضرمي [١] و جون ت . هيوبر [٢]

١ قسم الانتاج الحيواني، كلية العلوم الزراعية ، جامعة الإمارات العربية المتحدة ص.ب. ١٧٥٥٥- العين

٢ قسم علوم الحيوان ، جامعة أريزونا ، توسان ، أريزونا ٨٥٧٢١ - الولايات المتحدة الأمريكية

ملخص :

استخدمت ٣٢ بقرة هولستين فريزيان خلال المرحلة المتقدمة من موسم الإدرار في دراسة لمدة ٤١ يوماً . رتبت الأبقار في أزواج (pairs) تبعاً لمستواها الانتاجي اعتماداً على انتاجها خلال فترة تمهيدية طولها ١٤ يوماً قبل بدء المعاملة . كانت المعاملات كما يلي :

١- مركزات قليلة (٧٥٪ دريس برسيم حجازي (جت) + ٢٥ ٪ مركزات) .

٢- مركزات عالية (٥٠٪ دريس برسيم حجازي (جت) + ٥٠٪ مركزات) .

لم يتأثر كل من المادة الجافة المستهلكة ، إنتاج الحليب المعدل الدهن (٥ر٣٪) ، تركيب الحليب ، التغيرات في وزن الجسم والحالة الجسمانية (body condition) للبقرة بالعلائق المختلفة في نسبة المركزات .

كلمات مفتاحية : أبقار حلوب ، مركزات ، دريس برسيم (جت) .