

Minnesota - Does Alfalfa-Hay NDFD Matter in a Dairy TMR?

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Three feeding trials were conducted to study the effect of alfalfa-hay in vitro neutral detergent fiber digestibility (IVNDFD, 48-hour laboratory incubation in rumen fluid) on Holstein dairy cow performance. Treatments (Lh, Ll, Hh, and Hl) included four alfalfa hays selected for relatively low-(L) or high-(H) NDF concentration, and relatively low-(l) or high-(h) IVNDFD within NDF-concentration pairs (Table 1).

During Study 1, alfalfa hays were fed at 15% of TMR DM for 133 days. Study 2 was a short-term study (21 days) in which the hays were fed at 96% of diet DM.

Analysis of alfalfa hay grab samples during Study 1 confirmed that the high-NDF hays (Hh and Hl) had similar NDF concentrations, but a 7% difference in IVNDFD (Table 1). Within the low-NDF hays, however, the Ll hay had 4% greater NDF than the Lh hay, and their IVNDFD values were not different. As a result, the study objectives were modified to evaluate responses to: a) alfalfa-hay IVNDFD in high-NDF hay diets and b) alfalfa-hay NDF concentration in low-NDF hay diets.

When alfalfa hays were fed at 15% of TMR DM; neither NDF nor IVNDFD of the alfalfa hay affected cow DM intake, fat-corrected milk yield, milk fat, or protein yield. Within low-NDF hay diets, actual diet DM digestibility was 7% greater for the Ll hay compared to the Lh hay. Within the high-NDF hay diets, a 7% difference in IVNDFD did not affect actual diet DM or NDF digestibility. Neither alfalfa-hay NDF concentration nor IVNDFD affected rumen pH or VFA concentrations.

When the four alfalfa hays were fed at 96% of diet DM for three weeks in Study 2, there were no differences in cow DM intake, milk production, milk fat, or protein yield. Within low-NDF hay diets, actual diet DM and NDF digestibility were 15% and 18% greater, respectively, for the Lh compared to Ll diet. In contrast, within the high-NDF diets, actual DM digestibility was 11% greater for the Hl compared to Hh hay, and there was no difference in actual diet NDFD.

Results suggest when alfalfa hay is fed at a low inclusion rate in a TMR, small differences in IVNDFD or NDF concentration are unlikely to affect dairy cow lactation performance. Given the challenges with forage sampling and IVNDFD repeatability, effectively implementing hay fiber digestibility variation in dairy cow diet formulation can be difficult.

Table 1. NDF (%DM) and IVNDFD for lactating dairy cows at the UMN-St. Paul.

Fiber Parameter	'Lh' Hay Low NDF High IVNDFD	'Ll' Hay Low NDF Low IVNDFD	'Hh' Hay High NDF High IVNDFD	'Hl' Hay High NDF Low IVNDFD
<i>Pre-Purchase</i>				
NDF	34	35	38	39
IVNDFD	52	42	52	43
<i>Pre-Study</i>				
NDF	37	36	42	41
IVNDFD	41	38	45	41
<i>Grab Samples During Study 1</i>				
NDF	38	41	43	43
IVNDFD	41	43	50	43