Effects of including alfalfa hay cut in the afternoon or morning at three stages of maturity in high concentrate rations on dairy cows performance, diet digestibility and feeding behavior

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ABSTRACT

Stage of maturity (SM) and cutting time (CT) are important factors affecting the feeding value of alfalfa hay in ruminants. No data is currently available about the effects of including alfalfa hay cut at different CT and SM in total mixed rations (TMR) containing high levels of concentrates on dairy cows performance. The objective of this study was to investigate the effects of including 200 g/kg dry matter (DM) alfalfa hay cut at two CT (18:00 and 06:00 h) and three SM (early bud, late bud and early flower) in a TMR with 650 g/kg DM concentrates and 150 g/kg DM barley silage on dairy cows performance, diet digestibility and feeding behavior. Eighteen cows were used in a cyclic change design over six treatments (2 CT × 3 SM) in three 21 d periods. Leaf:stem ratio, crude protein (CP) and soluble carbohydrate (SC) concentration of alfalfa hay decreased with advancing maturity. Including alfalfa hay with advancing maturity in the TMR decreased CP intake (kg/d) and fecal N (g/100 g DM) concentration in dairy cows (P<0.05). Neutral detergent insoluble CP (NDICP) and acid detergent fiber (ADF) of alfalfa hay, mean particle size and physically effective factor of TMR and eating behavior (min/kg DMI) of dairy cows increased with advancing alfalfa hay maturity (P<0.05). Cutting alfalfa hay in the afternoon vs. morning increased leaf:stem ratio, leaf content and SC concentration (P<0.05). Feeding TMR with afternoon cut alfalfa hay to dairy cows increased apparent total tract digestibility of DM, organic matter (OM) and CP and serum total protein and decreased fecal nitrogen production (N; g/d), fecal N:milk N ratio (P<0.05) and tended to decrease fecal N concentration (g/100 g DM; P<0.10). At the early bud and early flower stage, afternoon cutting vs. morning cutting increased DM, OM and CP digestibility, serum total protein and decreased fecal nitrogen production (g/d) in dairy cows. At the late bud stage, afternoon cutting vs. morning cutting improved milk lactose and total solid non-fat yield (SNF; kg/d; P<0.05). In general, alfalfa hay CT at