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Effect of supplement strategy on intake and digestion of prairie hay by beef steers

Abstract
The effects of supplemental corn (4 lb/day), rumen-protected methionine (4.25 grams DL-methionine per day), or a cooked molasses block (1 lb/day) on intake and digestion of prairie hay were measured in beef steers. Steers that consumed the cooked molasses block ate more forage than control steers, whereas forage intake was decreased by supplemental corn. Total tract organic matter digestion, expressed as a percent of intake, was numerically greatest for steers consuming the cooked molasses block. Digestible organic matter intake, a rough estimate of energy available to the steers, was unaffected by methionine but was increased by supplementation of either corn or the cooked molasses block. Digestible organic matter intake tended to be greater for the block than for corn. Providing protein in a more concentrated form (block) tended to be more beneficial, because the negative effects of starch (corn) on forage intake were avoided.

Keywords
Cattlemen's Day, 1997; Kansas Agricultural Experiment Station contribution; no. 97-309-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 783; Beef; Steers; Forage; Intake; Digestibility

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Summary

The effects of supplemental corn (4 lb/day), rumen-protected methionine (4.25 grams DL-methionine per day), or a cooked molasses block (1 lb/day) on intake and digestion of prairie hay were measured in beef steers. Steers that consumed the cooked molasses block ate more forage than control steers, whereas forage intake was decreased by supplemental corn. Total tract organic matter digestion, expressed as a percent of intake, was numerically greatest for steers consuming the cooked molasses block. Digestible organic matter intake, a rough estimate of energy available to the steers, was unaffected by methionine but was increased by supplementation of either corn or the cooked molasses block. Digestible organic matter intake tended to be greater for the block than for corn. Providing protein in a more concentrated form (block) tended to be more beneficial, because the negative effects of starch (corn) on forage intake were avoided.

(Key Words: Steers, Forage, Intake, Digestibility.)

Introduction

Intake of dormant forage often is limited by nutrient deficiencies. Degradable intake protein often is the most limiting nutrient. Deficiencies of degradable intake protein can reduce forage digestion and intake, thereby reducing the energy available for maintenance and growth of cattle grazing dormant forages. To increase available energy, supplements based on grains or on more concentrated sources of protein often are fed.
and fecal samples were collected daily in the morning, after which supplements and forage were offered.

**Results and Discussion**

One animal assigned to the cooked molasses block refused to consume his daily supplement; data from this steer were deleted from our analyses. Forage organic matter (OM) intake increased (P<.05) with cooked molasses block supplementation, but decreased with corn supplementation; rumen-protected methionine did not improve intake or digestion of forage (Table 1). Because animals assigned to the corn treatment received more supplemental OM than steers assigned to the other treatments, total OM intakes were similar between steers receiving corn and those receiving the cooked molasses block. This illustrates the substitution effect on intake of corn for forage. Organic matter digestibility was numerically highest for steers consuming the cooked molasses block. Corn did not affect digestion of the total diet, probably indicating that forage digestion was decreased when the highly digestible corn was included. Digestible OM intake, an indicator of energy available for maintenance and(or) growth, was increased by supplementation with either block or corn but tended to be higher for the block than for corn (P=.06).

In conclusion, supplemental corn increased digestible OM intake because the highly digestible starch more than offset its negative effect on forage intake. Digestible OM intake increased when animals received the cooked molasses block, because the additional protein (without extra starch) increased forage digestion, which subsequently increased forage and energy intake. Rumen-protected methionine was ineffective in stimulating forage intake or digestion by steers fed prairie hay.

**Table 1. Intake and Digestion of Prairie Hay by Steers Fed Different Supplements**

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>Corn</th>
<th>Methionine</th>
<th>Block</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage OM intake, lb/day</td>
<td>13.7 a</td>
<td>12.1 b</td>
<td>13.0 a</td>
<td>15.3 c</td>
<td>.24</td>
</tr>
<tr>
<td>Supplement OM intake, lb/day</td>
<td>.0</td>
<td>3.4</td>
<td>.0</td>
<td>.7</td>
<td></td>
</tr>
<tr>
<td>Total OM intake, lb/day</td>
<td>13.6 a</td>
<td>15.5 b</td>
<td>13.1 a</td>
<td>16.0 b</td>
<td>.25</td>
</tr>
<tr>
<td>Digestible OM intake, lb/day</td>
<td>6.8 a</td>
<td>7.9 b</td>
<td>6.4 a</td>
<td>8.6 b</td>
<td>.25</td>
</tr>
<tr>
<td>OM digestibility, % of intake</td>
<td>49.6</td>
<td>50.3</td>
<td>49.6</td>
<td>53.5</td>
<td>1.2</td>
</tr>
</tbody>
</table>

a,b,c Means within rows without common superscript differ (P<.05).