

LOW COST COW/CALF PRODUCTION

The Bulletin For Alumni Of The School

Volume 5

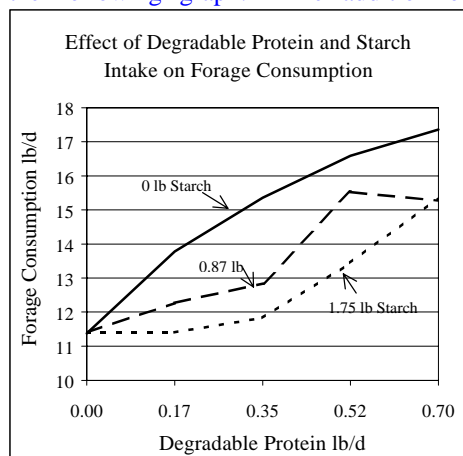
Number 4

Grass and Grits

Time at the School, as well as space in the Bulletin, is devoted to the subject of grain starch supplementation with concurrent reduced forage utilization. Researchers¹ at Kansas State University concur. They questioned, however, if there was always sufficient degradable protein available when starch-reduced forage utilization was observed. Thirteen ruminally fistulated steers (580 lb) were used in the study. Chopped prairie hay (4.9% protein) was fed ad libitum. Supplements were administered intraruminally daily. They included 5 levels of degradable protein (0, 0.17, 0.35, 0.52 and 0.7 lb/d) and 3 levels of starch (0, 0.87 and 1.75 lb/d). The source of degradable protein was sodium caseinate. Starch grits provided a pure form of starch.

A Good Way to Diet

There were no surprises. Supplementing with degradable protein had a dramatic positive influence on forage intake. See the following graph. The addition of

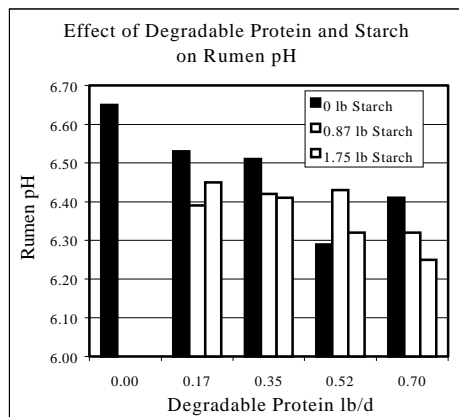


starch to the supplements decreased forage intake. Even in the presence of starch, degradable protein additions resulted in increased consumption. Negative effects of starch on low-quality forage intake could not be overcome fully by the addition of supplemental degradable protein.

How About Rumen pH?

Rumen pHs, for the 5 levels of degradable

protein, are shown in the chart below. The black bars reflect rumen pH in response to degradable protein only. Indications are that the rumen became more acid (lower pH) as degradable protein increased. Lower pH suggests increased rumen fermentation. While the presence of starch in the rumen tended to decrease pH, there was not a large depression. The particular treatment of 0.17 lb degradable protein and 1.75 lb starch had a higher pH than



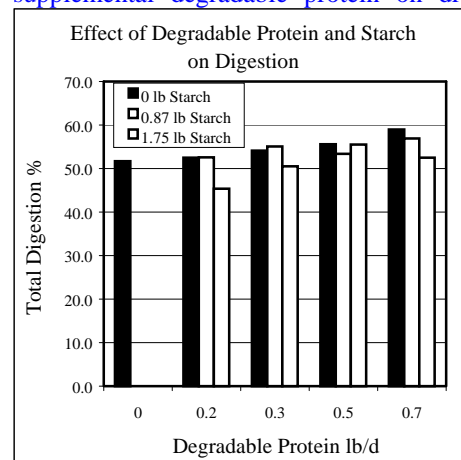
some treatments with less starch or no starch. Note that rumen pH never dropped below 6.2, the critical pH below which cellulase (enzyme that degrades cellulose) is inactivated. With rumen pH well above 6.2 for the vast majority of observations, what caused the decline in forage utilization?

Tough Bugs

Amylolytic microorganisms (AM) ferment starch and cellulolytic microorganisms (CM) ferment cellulose contained in forage. AM grow faster in the rumen than CM. Introduction of readily fermentable starch into a nutrient-deficient ecosystem could foster competition between AM and CM for any nutrients that are in short supply. The more aggressive AM will take the needed nutrients off the top and leave the dregs for the CM. Thus, the ability of the CM to grow and multiply through the fermentation of cellulose becomes limited. The end product of protein degradation is NH₃ (ammonia). Rumen microorganisms for the building of amino acids and microbial protein require NH₃. When the quantity of degradable protein is limited (as it was in this study), the AM may do well at the expense of the CM and forage utilization will suffer.

Diet Digestion

Total tract digestion was increased with supplemental degradable protein and decreased with the inclusion of starch. This is shown in the graph below. The effect of supplemental degradable protein on dry



matter digestion tended to be dependent upon the level of supplemental starch. Improved diet digestion is most likely the result of alleviating deficiencies in N-containing compounds.

Rumors

"I have been to many seminars on various topics, and I consider your School to have been the best prepared, best organized I have attended." Thank you, Nathan Creswick, Michigan.

Schools In 1999 - Y2K

Swift Current, SK January 24 - 27, '00

Red Deer, AB February 7 - 10, '00

Lethbridge, AB February 22 - 25, '00

Linda Lynch-Staunton

Beefbooster Management Ltd.

#26, 3515-27th St NE

Calgary, AB T1Y 5E4

(800) 668-1529 or (403) 291-9771

Billings, MT September 14 - 17, '99

Ogallala, NE September 20 - 23, '99

Sacramento, CA December 13 - 16, '99

Dick Diven

Agri-Concepts, Inc.

12850 N. Bandanna Way

Tucson, AZ 85737-8906

(800) 575-0864 or (520) 544-0864

¹ Olson, K.C., R.C. Cochran, T.J. Jones, E.S. Vanzant, E.C. Titgemeyer and D.E. Johnson. 1999. Effects of ruminant administration of supplemental degradable intake protein and starch on utilization of low-quality warm-season grass hay by beef steers. J. Anim. Sci. 77:1016.