THE USE OF SOYBEAN PROTEIN SUPPLEMENTS WITH LOW QUALITY ROUGHAGE FOR GROWING BEEF CALVES

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Three different soybean supplements are being evaluated as winter protein supplements for weaned, growing beef steers. Soybeans and soybean products are very popular as protein supplements for the livestock industry throughout the U.S., but vary in the degree of use depending on location and market price. This study was designed to evaluate the efficacy of replacing a traditional soybean meal (SBM) supplement with other sources of soybean protein, such as extruded soybeans (ESB) and whole soybeans (WSB). The primary objectives of this study are to: 1) evaluate and compare performance of weaned steer calves receiving a soybean meal plus rolled barley (SBM+BAR) supplement, WSB, or ESB as protein supplements on low to medium quality cool season grass hay. 2) Compare the effects on the intake and digestibility of the forage components in the respective rations. 3) Compare rate and extent of protein digestion of the different soybean supplements in the rumen.

Trial 1

Forty British X Exotic weaned steer calves averaging 250 kg have been stratified by weight across a completely randomized design to groups of 5 animals on 4 treatments with 2 replications of each treatment. Treatments consist of ground hay only (negative control), ground hay plus WSB, ESB, or a 62% SBM 38% rolled barley supplement. Hay is being fed ad libitum to all animals and supplements are fed at 1.5, 1.36, and 1.48 kg respectively to each group. Each supplemented treatment provides .80 kg of crude protein per hd/d on a dry matter basis.

Steer weights are being recorded every 28 days. Each weigh period is being analyzed for average daily gain and feed efficiency. Dry matter intake per pen is being measured weekly. Preliminary results (day 28) indicate average daily gain and feed efficiency of .77, 3.7, .95, 3.4, 1.3, 2.4, .55, 4.7 kg for WSB, ESB, SBM+BAR, and CONTROL respectively. Forage dry matter intakes have thus far been greatest for the SBM+BAR and CONTROL treatments.

This feeding trial was initiated on December 21, 1990 and will continue until April 12, 1991.

Trial 2

Four ruminally cannulated crossbred Hereford steers averaging 233 kg are being used for a digestion study. The study is utilizing a 4X4 Latin square design to give 4 replications of each treatment in Trial 1. Hay is being fed ad libitum once daily and supplements are being fed once daily at 1.5, 1.36, and 1.48 kg for WSB, ESB, and

SBM+BAR respectively. Each of the 4 periods of 23 days will commence with a 14-day adaptation period. A 7-day intake and fecal collection period is to measure dry matter and fiber intake and dry matter and fiber digestibility. On day 22 rumen fluid samples will be collected at 0, 3, 6, 9, and 12 hrs post-feeding to measure rumen pH, volatile fatty acid, and rumen ammonia concentration. On day 23 rumen evacuations will be conducted to measure dry matter and indigestible fiber fill, intake, and passage.

In situ nylon bags will be used to measure rate and extent of forage fiber and protein degradation in the rumen. Forage dry matter and neutral detergent fiber disappearances will be measured at 0, 6, 12, 24, 36, 48, 72, and 96 hrs from the time of insertion into the rumen. Supplemental crude protein disappearance will also be measured at 0, 6, 12, and 24 hrs from the time of insertion into the rumen.

It is the researchers hope that the results of the digestion trial will be useful in explaining the performance responses observed in the pen study (Trial 1).