

Kimberly Willer, Biology

Year in School: Senior
Faculty Mentor: Dr. Monty Kerley, Animal Sciences
Funding Source: Life Sciences Undergraduate Research Opportunity Program

Physiological and colonic microbial responses in the horse to feeding soyhulls

Soyhulls have a nutritional profile that makes them an excellent energy feedstuff for the horse. They have been used in horse rations, and have been shown to promote beneficial bacteria growth in the colon. The hypothesis of this research was that the horse would extensively digest soyhulls that indigenous bacterial populations in the colon would be increased, and plasma insulin concentration would be reduced. To test this hypothesis, four two year-old horses were fed experimental diets in a 4x4 Latin Square design. In each period diets were fed three weeks for acclimation followed by one week for blood and fecal sampling. Blood samples were collected at 1700 hrs on days 23-27 of each period. Diets consisted of (A) alfalfa hay, (S25) 75% alfalfa hay and 25% soybean hulls, (S50) 50% alfalfa hay and 50% soybean hulls, and (T) timothy hay. A commercially available supplement designed to make diets nutritionally complete or in excess of NRC recommendations was fed with all treatment diets. These diets resulted in variations of fiber level and form. Horses used in this experiment were stabled so feed intake could be measured and feces could be collected. Horses were managed according to approved animal handling procedures. Measurements made included fiber and nutrient digestibility, bacterial enumeration, plasma insulin, plasma glucose and plasma urea nitrogen. Grain intake was 2.5 Kg. Roughage intake was 5 kg. Supplements were individually offered. Horses were weighed on day 25 of each period and body condition scored on day 28 of each period. Lactobacillus populations did not differ among diets. Horses fed diet S25 (75% alfalfa 25% soyhulls) had greater population counts of Bifidobacteria and E. Coli. Horses fed timothy hay had the lowest plasma insulin and plasma urea nitrogen (pun) level. Feeding soyhulls also reduced pun level. Horses were capable of extensively digesting soyhull fiber.