

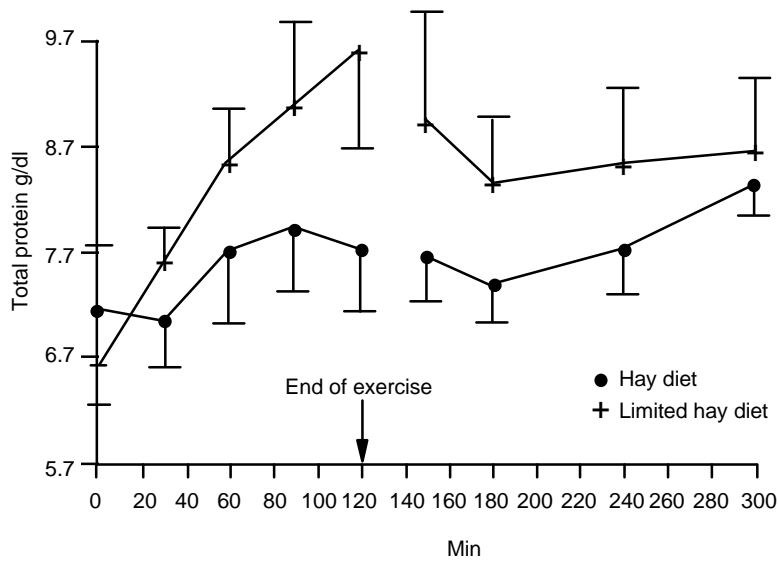
## EFFECT OF DIET ON WEIGHT LOSS AND PLASMA VARIABLES IN ENDURANCE EXERCISED HORSES

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Endurance rides impose great physiological stress on horses, particularly in hot environments. One of the physiological consequences of endurance exercise is the dehydration that can result from large sweat losses. Sweat losses as high as 8 to 9 % of body weight (about 80 to 90 lb for a 1000 lb horse) have been measured during long term exercise (Snow *et al.*, 1982). Because large sweat losses may affect the performance and/or health of the horse, strategies that assist the horse in maintaining fluid and electrolyte balance during endurance exercise may be beneficial. Absorption of fluid from the gastrointestinal (GI) tract into the extracellular fluid may be important in exercising horses (Carlson *et al.* 1987), and Meyer (1987) has suggested that the composition of the diet consumed prior to competition may affect the amount of water available in the GI tract during competition.

This study was conducted to determine whether diet composition could affect electrolyte and water balance in horses during endurance-type exercise. Two crossover design experiments, each using four horses, were performed to compare the effect of consuming a high hay/low concentrate diet to a limited hay/moderate concentrate diet. Changes in body weight and plasma total protein concentrations were used to monitor dehydration. In experiment 1, the diets were controlled only the night before the exercise test. Water intake was lower when horses received the limited hay diet ( $P<0.001$ ). Average weight loss during the exercise test was 2.8% of body weight and was not affected by treatment. Plasma protein concentration increased during exercise, but there were no diet differences ( $P>0.05$ ). In experiment 2, horses were adapted to the diets for 7 days prior to the exercise test and a more strenuous exercise test was used. Again, water intake was lower ( $P<0.01$ ) when the horses received the limited hay diet. During exercise, both groups lost about 4% of body weight, but the increase in total protein concentration was lower ( $P<0.05$ ) in the horses receiving the high hay diet (figure 1). Horses receiving the high hay diet also maintained a higher plasma potassium concentration during exercise ( $P<0.05$ ).

The increased water intake and the lower plasma protein concentration associated with the hay diet may indicate that high hay diets are beneficial to horses involved in endurance type exercise. Currently, studies are underway to evaluate whether the source and/or type of fiber in the diet can affect water balance during exercise.



**Figure 1.** Changes in plasma concentrations of total protein during exercise (0–120 minutes) and recovery (150–300 minutes) for horses on a high hay diet and a limited hay diet in Experiment 2. Bars represent standard error of means (n=4)

## References

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