

Nutrition (2)

102

Sampling of feces during daytime is sufficient when titanium dioxide is used to estimate organic matter digestibility in equine



F.J.W.C. Schaafstra^{a,b}, D.A. van Doorn^{a,c}, J.T. Schonewille^a, S. van Laar^d, M.C. Blok^e, W.H. Hendriks^{a,d}

^a Department of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, Utrecht, the Netherlands;

^b Department Applied Biology, HAS University of Applied Sciences, 's-Hertogenbosch, Noord-Brabant, the Netherlands; ^c Department of Equine Sciences, Faculty of Veterinary Medicine, Utrecht University, Utrecht, Utrecht, the Netherlands; ^d Animal Nutrition Group, Wageningen University, Wageningen, Gelderland, the Netherlands;

^e Wageningen Livestock Research, Wageningen, Gelderland, the Netherlands

Digestibility of organic matter (OMD) can be determined by total feces collection (TFC) and the use of a digestibility marker. Recently, titanium dioxide (TiO₂) has shown potential as an external digestibility marker in equines (Schaafstra et al., 2015, *J. Anim. Sci.* 93:4742; Schaafstra et al., 2017, *Animal* 11:1922). However, the results of these studies were based on TFC. Ideally, fecal Ti excretion throughout the day should be known to design a more efficient fecal sampling scheme that would allow partial collection. Therefore, the effect of time of fecal sampling during the day on the excretion of Ti was studied based on the partial fecal collection that was additionally executed in forementioned studies. In the first experiment (Schaafstra et al., 2015) Welsh pony geldings consumed grass hays consisting of different ADF content supplemented with TiO₂ (3.9 g Ti·d⁻¹). In the second experiment (Schaafstra et al., 2017), Welsh ponies were fed diets containing haylage and concentrate at 4 different haylage-to-concentrate ratios and added TiO₂ resulting in a Ti intake of 3.7 g·d⁻¹. The diets were iso-energetic (nett energy (NE) basis) and energy intake was calculated to be 22 MJ NE·d⁻¹. In both experiments, voluntary voided feces were quantitatively collected for 24 h divided over 6-h intervals for 5 consecutive days. Organic matter and Ti concentration in feed and feces were used to calculate OMD_{Ti} for the 4 time intervals (T0–6; T6–12; T12–18 and T18–24) and for the whole 24-h period (T0–24). A paired samples *t*-test was used to determine whether the difference between the Ti-concentration or OMD_{Ti} at each interval and the Ti-concentration or OMD_{Ti} measured after 24-h feces collection was different from 0 (*P* < 0.05). In case an all-hay diet was fed (Exp. 1), fecal Ti concentration (g·kg⁻¹ OM) as well as OMD_{Ti} (%) at T0–6 and T18–24 were different from the values obtained for the whole 24-h period (T0–24) (*P* < 0.001). In Exp. 2, the fecal Ti concentration and OMD_{Ti} at T12–18 were similar compared with T0–24 (*P* = 0.815; *P* = 0.095, respectively). When data of both experiments were combined, fecal Ti concentration (g·kg⁻¹ OM) and OMD_{Ti} (%) measured at time interval T6–12 and T12–18 were similar to T0–24 values (*P* > 0.123). The current results indicate that fecal Ti excretions at time intervals T6–12 and T12–18 both represent the fecal excretion of Ti and OMD. Therefore, it is recommended to use fecal sampling designs based on partial collection during day time (T6–18) for the evaluation of digestibility of similar type of diets.

Key Words: digestibility, partial feces collection, TiO₂

103

A comparison of the nutrient composition of European feeds used at the 2010 and 2018 FEI World Equestrian Games



J.D. Pagan^{*}, E. Phethean, C. Whitehouse, M. Lennox
Kentucky Equine Research, Versailles, KY, USA

Held every 4 years since 1990, the FEI World Equestrian Games (WEG) are the major international championship for 8 equestrian disciplines. Although the 2010 and 2018 editions of WEG took place in the United States, the majority of the horses competing came from Europe and were fed feeds made by European manufacturers. In 2010, Kentucky Equine Research sampled 90 European feeds fed at WEG, which were manufactured by 26 feed companies from 7 countries. In 2018, 90 European feeds used at WEG were again sampled and represented 21 manufacturers from 7 countries. These feeds were used across a range of disciplines at WEG and could be considered representative of feeds commonly fed to elite European sport horses. The feeds sampled were concentrates intended for performance horses and did not include high-fat supplements such as rice bran with >15% fat, high-protein balancers or forage-based feeds. Also, 15 feeds described as mashes were sampled in 2010, and 10 mashes were sampled in 2018. The concentrates and mashes were analyzed for dry matter (DM), crude protein (CP), crude fat (fat), starch, water soluble carbohydrate (WSC), acid detergent fiber (ADF), neutral detergent fiber (NDF), lignin, ash, calcium (Ca), phosphorus (P), magnesium (Mg), sodium (Na), potassium (K), iron (Fe), copper (Cu), zinc (Zn) and manganese (Mn). Nonstructural carbohydrate (NSC) was calculated as starch + WSC. Digestible energy (DE) was estimated from composition data. Differences in composition between feeds sampled in 2010 and 2018 were determined using an unpaired *t*-test. In the concentrate feeds, there were no differences between 2010 and 2018 in DM, fat, WSC, NDF, lignin, Ca, Mg, Na, K, Cu, Zn or Mn. Concentrates sampled in 2018 were higher in CP, ADF, P (*P* < 0.01) and Fe (*P* < 0.05) and lower in DE, starch and NSC (*P* < 0.01). In the mashes, there was no difference in DM, CP, fat, WSC, lignin, Ca, P, Mg, Na, K, Cu, Zn or Mn. Mashes sampled in 2018 were higher in ADF, NDF and Fe (*P* < 0.05) and lower in starch, NSC and DE (*P* < 0.01). Between 2010 and 2018, European sport horse feeds have followed the global trend of reduced starch and NSC. They also increased fiber with no change in fat, resulting in a decrease in DE compared with 2010. This study did not evaluate how the feeds and mashes were fed in conjunction with each other and other forages, so it is not possible to accurately determine daily nutrient intake. Compared with sport horse feeds in the US, these feeds tended to be fairly low in fat (5.15 ± 0.21%), and high in starch (22.38 ± 1.0) and NSC (30.40 ± 0.95%) (mean ± SEM, as-fed basis).

Key Words: World Equestrian Games (WEG), feed composition, NSC

104

Omeprazole reduces calcium digestibility in Thoroughbred horses



J.D. Pagan^{*}, L. Petroski-Rose, A. Mann, A. Hauss
Kentucky Equine Research, Versailles, KY, USA