

removed every 4h and urine removed after each urination event. Water was offered *ad libitum* and measured daily by subtracting the remaining amount from the starting quantity. DMI, urine and fecal dry matter (DM) output were also measured daily during each collection period. Measurements were averaged over the 4d collection period and intakes and outputs are reported as g/kg BW. Data were analyzed using PROC MIXED of SAS. *P*-values of = 0.05 were considered statistically significant. When the overall F-test was significant, Fisher's LSD was utilized for pairwise comparisons. The results for each diet are reported in Table 1. Water intake did not differ between diets. DMI, urine and fecal DM output for beet pulp high (BPH) was lower than that of all other diets. DMI and fecal DM output for oat high (OH) and rice bran high (RBH) were lower than beet pulp low (BPL), oats low (OL) and rice bran low (RBL). These findings suggest that DMI and energy source affect outputs and provides preliminary data for further studies investigating nutrient excretion.

Key Words: dietary energy, output, water intake

71

Effects of the novel feed additive Phytozen on immune and endocrine function in senior horses

M.H. Siard¹, A.L. Wagner², B. Médina³, I.D. Girard⁴, and A.A. Adams¹

¹University of Kentucky, Lexington, KY, USA; ²Cooperative Research Farms, Richmond, VA, USA; ³Laboratoires Phodé, Albi, France; ⁴Probiotech International, Saint-Hyacinthe, Quebec, Canada

Aging horses exhibit chronic, low-grade inflammation systemically, termed inflamm-aging. To mitigate this systemic inflammation, the first generation of Phytozen (Probiotech International Inc., Saint-Hyacinthe, Quebec, Canada), a proprietary blend of fatty acids and vegetable extracts, was evaluated in this pilot study, as both fatty acids and vegetable extracts have been found to exhibit anti-inflammatory effects in other species. Six senior horses (20 ± 2.6 years old) exhibiting inflamm-aging received Phytozen (22 g), wheat middlings (18 g), and Tribute Essential K balancer (0.1% BW) for 30 d, while being maintained on hay (1.5% BW). Horses were tested pre and post supplementation to determine their endocrine responses to oral sugar test (measured insulin response), dexamethasone suppression test (cortisol response), and thyrotropin releasing hormone (TRH) stimulation test (adrenocorticotropin, ACTH) response). To examine immune response, peripheral blood mononuclear cells (PBMC) were isolated pre and post study to determine lymphocyte production of inflammatory cytokines via intracellular staining and flow cytometry. RNA was also isolated from PBMC using Trizol and from whole blood using Tempus Blood RNA Tubes. RNA was then reverse transcribed, and cDNA was quantified via RT-PCR using the $\Delta\Delta CT$ method to calculate relative quantity (RQ) values. Results were determined using ANOVA with repeated measures using SigmaPlot version 10.0. Whole blood pro-inflammatory interleukin (IL)-6 mRNA expression significantly (*P* = 0.003) decreased, while tumor necrosis factor α (TNF α) mean fluorescence intensity significantly (*P* = 0.015) increased after 30 d of supplementation. ACTH hormone levels exhibited a decreased response to TRH stimulation after 30 d of supplementation both at 10 min (*P* = 0.044) and 30 min (*P* = 0.031) after TRH injection. The decreased inflammatory response (IL-6) exhibited after horses received supplementation with Phytozen shows that this supplement may reduce inflammation in whole blood. However, these results are contradictory in that pro-inflammatory TNF α was also increased in lymphocytes over the course of the study;

thus, additional research is warranted. ACTH levels in response to TRH stimulation were significantly decreased following the 30 d supplementation, indicating improved pituitary function, although these results may have been influenced by season, which would be further elucidated with additional investigation. This pilot study suggests the potential of Phytozen to modulate inflammation and pituitary function in the old horse.

Key Words: immune, endocrine, aging

72

Immunoglobulin subclasses in colostrum and plasma of Quarter Horse mares and foals fed diets with or without added probiotics

A. Sutton¹, A. Moffett², W.B. Staniar^{1*}, and P. Harris³

¹The Pennsylvania State University, University Park, PA, USA;

²MARS Horsecare US Inc., Dalton, OH, USA; ³Waltham Centre for Pet Nutrition, Waltham on the Wolds, Leicestershire, UK

The transfer of immunoglobulins from broodmare to foal is critical to immunity, and health of the foal. There is integration between the immune system and environment in the gastrointestinal tract, which suggests that dietary modifications could potentially affect immunoglobulin production. The objective of this study was to evaluate immunoglobulin concentrations in plasma (mare and foal) and colostrum before and after parturition in Quarter Horse mare and foal pairs fed diets that either did not (*n* = 8) or did (*n* = 6) contain a probiotic supplement consisting of a mixture of *E. faecium*, *L. acidophilus*, *L. brevis*, *L. plantarum*, and *P. acidilactici*. Both diets provided above NRC recommended nutritional intakes for pregnant and lactating mares. The mares were 11 ± 4 years of age, had an average parity of 4 ± 2 foals, and gestation length was 334 ± 5.6 d for the group. Mares were all started on the study diets on the same day, resulting in their being fed the diets for 54 ± 16 d before parturition. Baseline plasma samples were collected 1 d before the diets were introduced. Within 30 min of parturition, pre-suckle colostrum and plasma was collected from the mare and plasma from her foal. Volume of colostrum consumed was not measured. Postsuckle plasma was collected from the foals 1 d and 2 weeks post-parturition. Concentrations of IgG α , IgG β , and IgG(T) were measured in plasma and colostrum using a commercial ELISA (Bethyl Laboratories). Differences were evaluated using ANOVA with significance established at a *P* < 0.05. Inter and intra-assay CVs for each of the assays were below 10%. There was no detectable effect of mare age and parity on any of the immunoglobulins (*P* > 0.05) and there was no difference detected in immunoglobulin concentrations due to diet or time in the mares' plasma or due to diet in the colostrum (*P* > 0.05). There was no effect of diet, but the immunoglobulin concentrations increased in foals' plasma between the pre and postsuckle samples (*P* < 0.001) with concentrations in the pre-suckle samples below the limit of detection. The immunoglobulin concentrations measured are comparable to other published values but in this small pilot study, no effect of diet was detected on IgG isotypes in either colostrum and/or plasma samples collected from mares and their foals. This may mean that this dietary probiotic supplement has no influence on immunoglobulin production in the mare, or alternatively that either the study groups were too small to show any effect or that such a diet needs to be fed for longer or a higher concentration of the probiotic to be included for any effect to be detected.

Key Words: immunoglobulins