Effectiveness of Brewer’s Yeast Supplement in Combination with or without Fat Supplementation for Performance Horses

Abstract

The objectives of the current trial were to evaluate the effects of additional fat supplementation to a brewer’s yeast supplement on hoof, coat, and body condition of performance horses. Twelve performance geldings were utilized in an 84 d feeding trial using three dietary treatments: 1) a commercially available horse feed (10 % CP, 4.5 % fat) at 0.9 % BW; 2) diet 1 plus a brewer’s yeast product (amount fed at the recommended feeding rate); 3) diet 2 plus vegetable oil at 5 % of the diet. Diet 1 was given to meet basic nutrient requirements of 10% CP and 0.6% LYS. All horses were fed half of their diet treatment twice a day for 84 days. All horses had ad libitum access to bermudagrass pasture and hay throughout the trial. Body weight (BW) measurements and body evaluations were collected at initiation of the trial and every subsequent 28 d until 84 d. Body evaluations included coat condition, body condition score (BCS), and hoof condition. Coat and hoof condition were evaluated on scales ranging from 1 to 5 (1 reflecting poor or damaged and 5 reflecting glossy) accounting for condition, texture and appearance. Body condition score was based on the standard BCS scale of 1 to 9. Data was subjected to ANOVA using the GLM procedures of SAS. Performance horse data reported no effect of diet for hoof (3.5, 3.4, and 3.1; P = 0.6207), coat (3.3, 3.3, and 3.3; P = 0.0826), or BCS (5.3, 5.6, and 5.6; P = 0.9967) for diets 1, 2, and 3, respectively. Performance horse body weights (BW) were not different (509, 524, and 560 kg; P = 0.4602) among diets 1, 2, and 3, respectively, nor was the change in BW during the trial different (1.9, -6.8, and 4.5 kg, respectively; P = 0.6815). Addition of fat to a brewer’s yeast supplement did not impact BCS, coat condition or hoof condition in performance horses. Overall, diet 1 (basal diet fed to all treatments) was a concentrate based supplement containing a large amount of available energy. Feeding diet 1 at 0.9% BW/d may have masked the effects of increased energy from fat and additional benefits often observed in feeding brewer’s yeast supplements. Further research should be conducted to evaluate the impact of brewer’s yeast supplements and fat fed to horses while being fed a less nutritious basal diet.

Introduction

One of the most important areas of focus in performance animals is nutrition.

Performance horses need appropriate amounts of energy to be competitive and maintain training condition. However, the ability to perform is not the only goal in some disciplines. Having healthy coats, good hoof quality, and body condition are needed, as well as the appropriate performance. Yeast enhances starch digestive capacity in the small intestine and may be
beneficial for decreasing cecal acidosis and enhancing cecal digestion. In addition to vitamin and mineral supplements, supplementation with yeast can be particularly beneficial to performance horses (Lewis, 1982). Besides the benefit of enhanced digestion when yeast is supplemented to the diet, yeast also increases the protein concentration of the diet. After absorption, any excess protein will be removed in the form of ammonia, with the resulting keto acids used to make fatty acids and/or glucose to be stored as either fat or glycogen, respectively. The use of protein supplements can also have beneficial effects on hair coat as well as hoof condition, which is important for performance horses. Adding dietary fat can be similar to adding additional protein in regards to its effect on hair coat and hoof health, as well as increasing energy density of their diets. Fat supplementation to the equine diet increased glycogen content of muscle (Lewis, 1982). Training of performance horses in order to increase physical conditioning can also increase glycogen in muscle. Increasing glycogen concentration in muscle, while decreasing rate of utilization of glycogen, delayed the rate of fatigue for aerobic exercise (Lewis, 1982). The body may be preferential for utilizing fat for energy and allowing excess amino acids from dietary protein to be converted to glucose and stored in muscle as glycogen (Lewis, 1982). If horses can obtain more fat from their diet and use it for energy, then use of protein for energy (which is less energy efficient) may be decreased, allowing for other areas of the body, such as hooves and coat to utilize the protein.

Although brewer’s yeast products increased feed intake, enhanced digestion and growth in monogastrics (White et al., 2002), few studies have been performed to examine the effects on physical attributes of horses. Therefore, the objective of the current study was to examine the effects brewer’s yeast and brewer’s yeast paired with fat have on physical attributes of both performance and weanling horses.
**Materials and methods**

**Animals**

Twelve performance horses were fed twice daily (0600 and 1800 h) based on BW. All horses were housed at the H. H. Leveck Animal Research Center at Mississippi State University. A 2 week adjustment period was provided to insure feed intake and to adjust to diet. All horses were housed on an 80 % bermudagrass and 20 % dallisgrass pasture until completion of the study.

**Diets and treatment**

Geldings were randomly assigned to one of three treatments. Treatments consisted of diet 1) Omolene 100 at 0.9 % BW (amount was based on forage analysis and assumption that horses would eat 1.0 % BW/d of grass/hay); diet 2) diet 1 plus a brewer’s yeast supplement at 227 g/d (based on recommended feeding rate of 8 oz/hd/d); diet 3) diet 2 plus vegetable oil at 5 % of the treatment. Horses were fed using individual feed bags.

**Evaluations**

Geldings were fed for 84 d, from late July until mid-November, with an evaluation of hoof condition, hair coat, body weight (BW) and body condition score (BCS) every 28 d. Any feed refusals were weighed and recorded to determine DM intake. Geldings were evaluated on body, hoof, and coat condition. Evaluations took place on the first day of the trial and every 28 d until 84 d. Coat and hoof condition were evaluated on a scale ranging from 1 to 5 (1 reflecting poor or damaged and 5 reflecting glossy), with coat evaluation scale accounting for condition, texture, and appearance. Hoof condition was evaluated using a 5 point hoof score system based on Mansmann et al. (2013). Coat luster and health scores were based on Marsh et al. (1999), which was modified for horses. Body condition score was based on the standard Henneke (1985) scale of 1 to 9. Two evaluators, blinded to treatment, scored all horses on hoof and hair coat appearance, as well as BCS every 28 days for the duration of the trial. Horses were also weighed every 28 days.
Statistics
Dependent variables were subjected to ANOVA of the MIXED procedure of SAS using repeated measures. Model statement included dietary treatment, day, and their respective interaction. Treatment means were separated using the PDIFF option of the LSMEANS statement.

Results
No effect of diet was found for hoof (3.5, 3.4, and 3.1; P = 0.6207; Graph 1), coat (3.3, 3.3, and 3.3; P = 0.0826; Graph 2), or BCS (5.3, 5.6, and 5.6; P = 0.9967; Graph 3) for treatment 1, 2, and 3, respectively. Body weights were not different (509, 524, and 560 kg; P = 0.4602; Graph 4) among treatment 1, 2, and 3, respectively, nor was the change in body weight during the trial different (1.9, −6.8, and 4.5 kg, respectively; P = 0.6815; Graph 5). Addition of fat to brewer’s yeast supplement did not enhance BCS or change BW. Treatment 1 (basal diet fed to all treatments) was a concentrate based supplement containing a large amount of available energy. Feeding treatment 1 at 0.9% BW/d may have masked the effects of increased energy from fat and any additional benefits that may have been observed due to feeding brewer’s yeast. Further research should be conducted to evaluate brewer’s yeast and fat with horses while being fed a less nutritious basal diet that does not meet NRC requirements.

Conclusion
All-natural nutritional supplements, such as brewer’s yeast, have been added to equine diets to improve skin and coat quality, muscling, and hoof condition. Dietary fat has also been reported to improve nutritional characteristics and physical attributes (Holland et al. 1998). Supplemented fat, paired with brewer’s yeast, was hypothesized to produce an ideal set of physical attributes, while still providing a balanced diet for horses in performance scenarios. The current study reports no increase effects on hair coat when fat was added to brewer’s yeast supplementation. Results indicate supplementation with brewer’s yeast alone will be consistent
with or without adding fat to the diet. However, brewer’s yeast paired with fat supplementation may have beneficial effects for performance horses in other areas. For example, hair coat and BCS improvements could be especially favorable when preparing a horse for performance or presentation. Diets were balanced for energy based on an assumed forage intake. Due to poor quality forage, a large portion of the diet consisted of Omolene, and horses were required to consume all of the Omolene (treatment 1 diet) via feedbags. It is likely that additional fat affected glucose (from grain based starch) metabolism, therefore horses were energy efficient during exercise; however, this did not translate into body, coat, or hoof condition. If horses were fed a diet containing marginal energy, or one that did not meet NRC requirements, it is possible the dietary addition of fat would increase the effect of these parameters even more (body, coat, and hoof quality) when fed in combination with brewer’s yeast product.

**Recommendation**
While there were limited statistical differences demonstrating improvement with feeding brewer’s yeast compared to control, there is no evidence which would allow for a decision to not feed brewer’s yeast. However, there was no evidence demonstrating a benefit when fat is added to diets containing brewer’s yeast, but horses marginally deficient for energy may benefit from the addition of fat to their diet.

**Literature Cited**


Lewis, L. D. 1982. Feeding and care of the horse. 1st Ed. Lippincott, Williams, and Wilkins, Media, PA, USA.

Mansmann R. [http://equinepodiatrync.homestead.com/HealthyHorseHoofTestPrintVersion.html](http://equinepodiatrync.homestead.com/HealthyHorseHoofTestPrintVersion.html)

Graph 1. Effect of brewer’s yeast supplement and fat on hoof score of performance horses

Graph 2. Effect of brewer’s yeast supplement and fat on coat score of performance horses
Graph 3. Effect of brewer’s yeast supplement and fat on body condition of performance horses

Graph 4. Effect of brewer’s yeast supplement and fat on body weight of performance horses
Graph 5. Effect of brewer’s yeast supplement and fat on body weight change of performance horses

Table 1. Effect of brewer’s yeast supplement and fat on body weight, coat score, hoof score, and body condition score of performance horses.

<table>
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<th>BW(kg)</th>
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<th>Hoof</th>
<th>BCS</th>
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