PURINA

REVIEW >

< RESEARCH

Evaluation of Milk from Mares Fed Ultium® Growth Horse Feed

A SUMMARY OF RESEARCH CONDUCTED AT THE PURINA ANIMAL NUTRITION CENTER, EVALUATING MILK COMPOSITION FROM MARES FED A FAT AND FIBER-ADDED DIET, PURINA® ULTIUM® GROWTH HORSE FEED.[1]

< INTRODUCTION >

Early in the life of a young horse, there is no more important source of nutrition than mare's milk. It has been estimated that a foal may consume up to 35 pounds of milk in a single day during early lactation. The composition of the milk is directly impacted by the nutritional composition of the mare's diet. Traditionally, concentrate feeds designed to be fed to lactating mares have been high in soluble carbohydrates while containing relatively low levels of fat and fiber. Previous research conducted at the Purina Animal Nutrition Center has established Purina® Ultium® Growth horse feed, a fat and fiber-added feed, to be suitable to meet the nutritional needs of pregnant and lactating mares, and young growing horses. However, it is unknown whether the use of fat and fiber as an energy source in concentrate diets fed to lactating mares will alter the composition of mare's milk. The objective of this study was to evaluate the nutrient content of milk obtained from mares being fed Purina® Ultium® Growth horse feed, a fat and fiber-added concentrate feed.

< MATERIALS AND METHODS >

Ten Quarter Horse mares (BW at d 293 of gestation 1381.8±83.8 lb) aged 10.2±2.5 yrs received Ultium® Growth horse feed (15.5% crude protein, 9.5% fat, 13.0% max fiber, 16.6% starch, 10.0% sugar, 3.7 Mcal/kg) beginning 6 weeks prior to expected foaling date and continuing through a 140-d lactation period. Mares were fed Purina® Ultium® Growth horse feed at a rate of 0.5% BW/d until foaling split into two meals. The rate was increased to 1% BW/d to maintain a BCS of 5-7 during peak lactation. Grass hay was fed to mares at a rate of 1% BW/d. Foals were initially creep-fed beginning at 28 d of age, starting with 0.50 lb Ultium® Growth/d, increasing at a rate of 0.50 lb every other day until all horses reached an equal rate of 8.0 lb/d split into an AM and PM feeding. Foals also consumed grass hay along with their dams during the creep feeding period. Foals were weaned at 140 d of age. Beginning on d 1 of lactation, milk samples were collected every 14 d until foals were weaned at 140 d of age. Samples were shipped to Dairy One (Ithaca, NY) for analysis within 24 h of collection. Samples were analyzed for fat, protein, Ca, P, Mg, K, Na, Cu, and Zn.

[1]Vineyard, K.R., M.E. Gordon and M.L. Jerina. 2011. Milk composition in mares fed a fat and fiber-added concentrate. *Journal of Equine Veterinary Science* 31(5); 257.

[2]National Research Council. 2007. Nutrient requirements of horses, 6th revised edition. *The National Academies Press.*

[3]Hoffman RM, Kronfeld DS, Herbein JH, Swecker WS, Cooper WL, Harris PA. 1998. Dietary carbohydrates and fat influence milk composition and fatty acid profile of Mare's milk. *J Nutri.* 128(12 Suppl):2708S-2711S.

[4]Oftedal OT, Hintz HF, and Schryver HF. 1983. Lactation in the horse: Milk composition and intake by foals. *J Nutri.* 113:2196-2206.

[5]Gordon, M.E., Jerina, M.L., et al. 2010-2015. HR 127, HR 137, HR 154, HR 170, HR 179, HR 197.

< RESULTS >

The composition of milk obtained from mares throughout lactation is depicted in Figure 1. Previous studies have determined the fat content of mare's milk to be 1.8% at 1 – 4 weeks, 1.7% at 5 – 8 weeks and 1.4% at 9 – 21 weeks, with an average fat content of 1.5% during a 6 month lactation period[2]. Feeding Ultium® Growth, a fat and fiber-added feed resulted in a slightly higher average fat content of 2.1% over a 5-month lactation period. The most notable differences in fat content were observed during early lactation, a critical period in the growth and development of young horses. Remaining nutrient parameters were not greatly different than previously reported values[3,4].

< IMPLICATIONS >

Previous research conducted at the Purina Animal Nutrition Center has demonstrated that Purina® Ultium® Growth horse feed can be an excellent feed for pregnant and lactating mares as well as young growing horses[5]. During the early postpartum period, the foal consumes large quantities of mare's milk in order to meet its nutritional requirements. This study[1] demonstrates that a fat and fiber-added diet fed to mares prior to and during lactation can result in the production of milk that is similar to that of mares fed a diet higher in soluble carbohydrates. The increased fat content of milk obtained from mares fed Ultium® Growth horse feed, specifically during early lactation, can be beneficial to the health and growth of offspring.

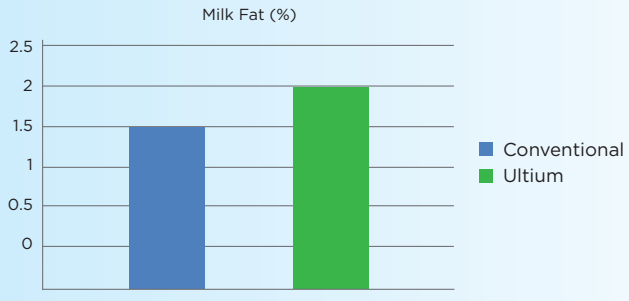
FIGURE 1

Milk composition of mares fed Ultium® Growth horse feed, a fat and fiber-added concentrate

TIME AFTER FOALING	PROTEIN (%)	FAT (%)	CONCENTRATIONS (µG/G FLUID MILK)						
			CA	P	MG	K	NA	CU	ZN
0 WK	2.6	3.4	880.0	870.0	100.0	1090.0	251.0	<1	2.5
2 WK	1.7	2.5	1060.0	630.0	100.0	640.0	152.0	<1	2.5
4 WK	1.6	2.2	900.0	520.0	100.0	600.0	134.0	<1	2.3
6 WK	1.6	2.0	850.0	480.0	100.0	570.0	136.0	<1	2.4
8 WK	1.8	2.0	833.3	466.7	77.8	522.2	138.9	<1	2.3
10 WK	1.8	1.9	760.0	470.0	70.0	550.0	143.0	<1	2.4
12 WK	1.5	2.1	740.0	460.0	60.0	490.0	127.0	<1	2.2
14 WK	1.8	1.8	670.0	440.0	60.0	480.0	125.0	<1	2.5
16 WK	1.5	1.8	610.0	400.0	20.0	480.0	116.0	<1	2.4
18 WK	1.6	1.8	600.0	390.0	20.0	430.0	112.0	<1	2.6
20 WK	2.0	1.7	570.0	360.0	40.0	510.0	133.0	<1	2.8
SUMMARY									
1-4 WK	2.0	2.7	946.7	673.3	100.0	776.7	179.0	<1	2.4
5-8 WK	1.7	2.0	841.7	473.3	88.9	546.1	137.4	<1	2.4
9-20 WK	1.7	1.9	658.3	420.0	45.0	490.0	126.0	<1	2.5
AVERAGE OF 5-MONTH LACTATION	1.8	2.1	770.3	498.8	68.0	578.4	142.5	<1	2.4

FIGURE 2

Milk fat percentage in conventional diet vs. fat and fiber-added Ultium Growth® horse feed.



< FOR MORE INFORMATION > Contact your local Purina representative if you would like more information about this study.

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