

February 2016 - Calories Versus Nutrients

Written by Dr. Gabi Gross

Tuesday, 02 February 2016 07:10

The difference between these two often-misunderstood terms is the key for performance energy and metabolic problems.

by Dr. Gabi Gross

Most of us have dealt with calories at some point in our own lives. Whether we wanted to lose weight or went on a bodysculpt program, counting calories was essential.

But what about our horses? Do they need calories?

**NUTRIENT COMPOSITION OF
SELECTED FEEDSTUFFS**

EQUULUTION

| Feed Name | DE (Mcal/DOM) | CP (%DM) | FE (%DM) |
|------------------------------------|------------------|-------------|-------------|
| Concentrates | | | |
| Beer Super Plus, unmoistened | 1.27 | 10.0 | 1.1 |
| Enanced Meal, softfeed | 1.30 | 32.6 | 1.7 |
| Midolam, moist mash | 1.85 | 8.8 | 0.2 |
| Orzo, Grain, rolled | 1.49 | 33.2 | 5.1 |
| Orzo, Grain, whole 20/30 per bu. | 1.47 | 33.6 | 4.9 |
| Orzo, Grain | 1.52 | 35.5 | 15.2 |
| Proforma, Moist, softfeed, 44% CP | 1.80 | 49.9 | 1.6 |
| Midolam, Grain | 1.46 | 33.9 | 4.3 |
| Forages | | | |
| Midolam, 17% CP | 1.10 | 19.2 | 2.5 |
| Midolam, Orchardgrass/Orzo Timothy | 1.05 | 18.4 | 2.3 |
| PrimoAgro, Hay, Coastal | 0.85 | 10.4 | 2.7 |
| Orzo, Hay, headed | 0.98 | 9.1 | 2.1 |
| Orchard/Timothy, mature | 0.93 | 10.8 | 2.0 |
| Orchard/Timothy, immature | 1.07 | 18.0 | 3.3 |
| Orchard/Timothy, mid-mature | 0.99 | 13.3 | 2.5 |
| Fats and oils | | | |
| Supplement Oil | 4.18 | 0.0 | 99.9 |

Notes:
DE = daily energy
CP = crude protein
Moist = moist feedstuff
DM = dry matter
DE = kcal/kg
*Source = Nutrient Requirements of Horses, sixth revised edition, National Research Council

You bet they do, and it's important to know how many. Strangely enough, while labels for human groceries are, by law, required to disclose the amount of calories, feed stuff for horses are not.

"Fifty-one percent of all horses in the USA are overweight," states a study performed by Dr. Craig Thatcher, Virginia-Maryland Regional College of Veterinary Medicine.

How can we keep the right weight on our horses if we know nothing about their calorie requirements?

Calories vs. Nutrients

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In my work with horse owners, I see confusion over the difference between calories and nutrients. A horse might crave nutrients, but not calories.

Calories are a measure how much energy is consumed through feed. Quite often I come across horses that get more than enough calories, but crave nutrients missing in their feed. Owners mistake this for “hunger,” thinking their horse needs more calories. The outcome is a fat horse still obsessed with food, but still lacking nutrients and a helpless horse owner.

A simple calorie evaluation would illustrate the difference and inspire a different approach. In an opposite scenario, counting calories is a good way to see if a “hard keeper” is getting enough energy from food.

A calorie is a measure of energy provided by the food we eat. All living organisms have energy requirements. The goal for overall health and a healthy weight is to balance the energy from food with the energy needed by the body.

In science terms, a calorie is the basic unit of heat energy defined as the amount of heat required to raise one gram of water one degree celsius. “Calories” really stands for kilo-calories. In horse terms, we use Mega-Calories, abbreviated as “Mcal.” One Megacalorie equals 1,000 calories. The daily energy requirement (DE) for horses is measured in Mcal/day.

Nutrients are the substances in food that our bodies process to enable it to function. While some nutrients provide energy, others don't. This means we can add deficient nutrients to a horse's diet without adding calories. This will eliminate cravings, which are born out of lack for nutrients. Commonly known nutrients that are energy/calorie carriers are carbohydrates, fats and proteins. Low- or no-calorie nutrients include vitamins and minerals.

Why This Matters

Case Study 1: Metabolic Issues.

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When I first met the 10 year old Quarter Horse pony named Jack he was overweight at a maximum body score of nine and he aggressively dug into his hay. The owner reported that he was lethargic under saddle and feed-obsessed.

Jack showed the typical clinical body type of a horse with metabolic problems. In fact, his veterinarian had just diagnosed Jack with equine metabolic syndrome, following blood tests indicating imbalanced leptin, insulin and glucose levels.

DAILY NUTRIENT REQUIREMENTS



| Type | 900 lbs | | 1100 lbs | | 1320 lbs | |
|------------------------|--------------|-----------|--------------|-----------|--------------|-----------|
| | DE (Mcal) | CP (g) | DE (Mcal) | CP (g) | DE (Mcal) | CP (g) |
| Adult (no work) | | | | | | |
| Minimum | 11.1 | 432 | 15.2 | 540 | 18.2 | 648 |
| Average | 13.1 | 504 | 18.2 | 630 | 20.2 | 756 |
| Excellent | 14.5 | 576 | 18.2 | 720 | 21.8 | 864 |
| Working | | | | | | |
| Light Exercise | 16 | 559 | 20.0 | 699 | 24.0 | 839 |
| Moderate Exercise | 18.5 | 614 | 23.3 | 768 | 28.0 | 921 |
| Heavy Exercise | 21.1 | 680 | 26.6 | 862 | 33.0 | 1024 |
| Very Heavy Exercise | 27.6 | 804 | 34.5 | 1006 | 41.4 | 1205 |

Notes:
DE = daily energy
CP = crude protein
Mcal = megacalories
g = grams
lb = pounds
*Source = Nutrient Requirements of Horses, sixth revised edition,
National Research Council

A calculation of his daily calorie intake showed that he consumed about 50 percent calories more than he required. Along with calorie calculations, we also evaluated which nutrients were missing in his diet. We then set a new feed program by reducing calories and adding the missing nutrients.

His owner, although in initial disbelief with how little her horse should be satisfied with, followed the program with diligence. Four months later, Jack had transformed into a well-muscled, lean horse with a beautiful topline. The owner reported that he was not craving feed anymore: sometimes she would even find hay left in his pen. His energy under saddle had markedly increased.

A blood test showed that his levels for leptin, insulin and glucose were within normal levels.

This is an example of a metabolic condition produced by unknowingly overfeeding a horse. Metabolic issues can be produced by weight gain. And conversely, metabolic issues can be the reason for weight gain. Counting calories is a good way to find out which way around we should look at the problem.

Even before metabolic issues occur, overweight horses face problems. Leptin, a hormone made

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by fat cells, increases oxygen requirements and production of free radicals. The results are lack of vitality, early aging and decreased threshold for inflammation often expressed through laminitis.

Case Study 2: Skinny Horse.

Mirko, a 7-year old Hannoverian Warmblood used for dressage, had problems gaining weight. His body score was between three and four, representing a horse too skinny for the discipline. By comparison, a conditioned racehorse might show a body score of 4.

Mirko also lacked topline and muscle. His teeth were in good shape, he seemed overall healthy, blood tests had come back without abnormalities and the fecal tests were negative. Records stated that the owners had already tried a variety of weight gain products, all with little success.

Because his owners did not want Mirko to get “too hot,” his daily feed consisted of six thick flakes of Timothy hay, at a total of 36 pounds daily, and two pounds of rice bran pellets. Mirko ate all his feed. The calorie evaluation showed that he ate twice as many calories as he needed daily, most of those from hay.

Feed is what goes into the gut, nutrition is what gets absorbed.

It became evident that Mirko had an absorption problem in the hind-gut, the place where hay gets processed. This shows the importance of knowing both how many calories are consumed and where they are being processed in the horse’s digestive tract.

The calorie evaluation and assessment of nutrients helped to create a better feed program for Mirko, on which he flourished.

Calories & Metabolic Rate

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The maintenance level of energy, meaning how many calories a horse burns at rest, is called the basic metabolic rate. This refers to a mature (not growing) and not pregnant horse. The basic metabolic rate is dependent on a horse's endocrine activity. The National Research Council for Equine Nutrition distinguishes between minimum (easy keepers), average and elevated metabolism (hard keepers). The calorie differences between the different groups are roughly 10 percent of the daily calorie requirements.

The formula for the daily calorie requirement for a horse with average metabolic rate is DE (Mcal/day) = Body weight (kg) x 0.0333 .

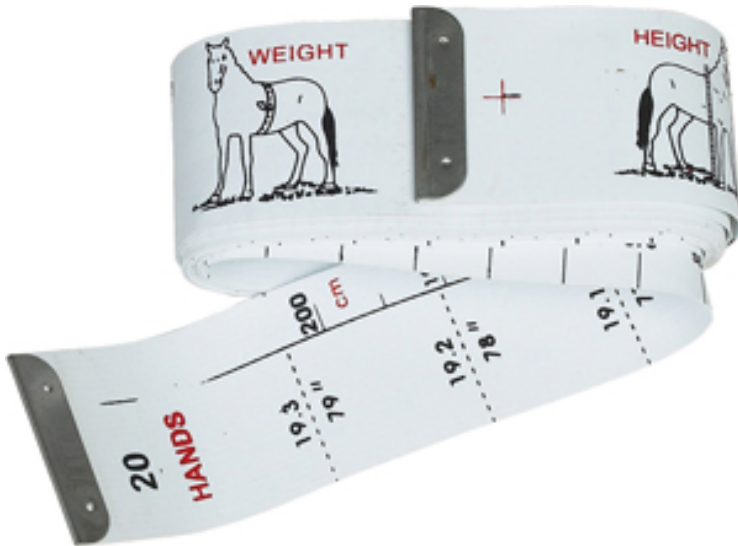
Note that this formula follows the metric system. This requires that you know the weight of your horse in kilograms: one kilogram is 2.2 lbs.

As an example, a 1,000-pound horse (454 kg) would need approx. 15 Mcal per day without exercise. A horse of same weight under saddle about one hour per day would consume approx. 20 Mcal/day.

Translating this formula to your feeding practices takes a little work, but is well worth it. Calories are measured by weight of the feed, not scoop size. So you need to know the weight of feed concentrates as well as hay flakes.

I recommend that every feed room have a scale. This is one of the best investments you can make for your barn. Fishing scales with a hook come in handy. They run around \$20-30 and you can hang feed buckets as well as hay nets on it. But any scale that shows a range of 0 to 10 pounds will do.

(If you are the scientist in the family and want to invest in the "equine nutrition bible," the "Nutrient Requirements of Horses, Sixth Revised Edition" by the National Research Council will give you all data. Be ready, it can be a bit overwhelming!)



Calculating Calorie Needs

1. Measure your horse's weight (using a scale or weight tape)
 2. Estimate the daily exercise. Unless you have a race- or plow horse, the exercise level is "light."
 3. Check the table for the appropriate calorie requirement
 4. Weigh all your horse's feed and hay flakes
 5. Add the daily amounts in pounds for each feed
 6. Check the table for the calorie content on each feed
 7. If you do not find the calories for your commercial feed, call the manufacturer and ask for the DE content (DE here means Digestible energy)
 8. Add the actual fed calories
 9. Compare with the calories needed
 10. If your horse has appropriate weight, is getting more energy than needed and still craves food, it is probably a lack in nutrients, not calories.
 11. If your horse is too skinny, and you are feeding enough, your horse has a health problem.
 12. If you need help with this, seek support from an independent nutritionist or a veterinarian schooled in nutrition.
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