Chewing the Fat – a closer look at the effects of feeding oils

By Dr. Tim Kempton

References made in the popular equine press about feeding oils to horses are often only brief and purport their usefulness mainly as an energy dense grain alternative. In the last article, I mentioned that dietary oil is also beneficial in that it does not carry with it the risks of starch-related metabolic disorders (e.g. 'fizzy' behaviour, laminitis, etc.). However, the effects of feeding oils to horses extend beyond this, and in this article we will 'chew the fat' more thoroughly, about the effects of feeding oils to horses!

Although horse diets have always contained small amounts of oil, a plethora of research and anecdotal evidence suggests that they are adept at utilizing higher percentages of oil in their diets. Horses adapted to higher-oil diets can digest and transport this extra dietary oil, as evidenced by increased bile production and elevated levels of lipoproteins in blood serum (lipoproteins are the proteins in blood that carry oil molecules). Unlike other animals, in the horse, bile is secreted fairly continuously from the liver and passes via a bile duct directly into the duodenum (bile is a salt solution which helps in the digestion and absorption of oils). Horses can then metabolize oils as an energy source through a process called 'fatty acid oxidation'. Hence, horses can efficiently digest, metabolize and utilize quite high levels of oils.

So what *are* the effects of oil-supplementation in horse diets?

1. Energy density of oil

Oil is very energy dense. It yields about 2¼ times more energy than starch or protein. This may be useful for a number of reasons including reduction in gut fill and reduction in feed intake required to sustain maintenance and exercise.

2. Benefits for horses in hot climates

The total amount of heat waste produced per unit of energy is different for different feeds, with oils producing significantly less heat waste than fermentable carbohydrates, roughages and proteins. Oil-supplemented horses in hot conditions have been reported to have lower mean body temperatures than those consuming high roughage and high grain diets.

Further, oil metabolism yields almost twice the water of protein and carbohydrate metabolism. This may benefit horses that sweat profusely.

The combined effects of oil feeding are to reduce thermal load and increase water production in horses working in hot environments.

3. Oil as a 'non-fizzy' feed

When starch (typically in the form of grain), is fed to horses in large quantities, there is a risk of starch overload into the hindgut. This can culminate in "fizzy" behavior, which can result in stressful and dangerous situations for both horse and rider. The risk of starch overload can be minimized by replacing some grain in the feed with oil, to provide energy. Oil provides a source of 'cool' energy, which is not associated with 'fizzy' behavior.

4. Role of oil in the management of Equine Rhabdomyolysis(tying-up)

Equine rhabdomyolysis ('tying-up') is a broad term used to describe equine muscle disorders including EPSM and RER. Equine polysaccharide storage myopathy (EPSM) has been associated with dysfunctional carbohydrate metabolism. Horses suffering from it must be provided with non-carbohydrate energy sources such as oil. Results indicate a reduction in clinical signs in EPSM horses consuming high oil, low carbohydrate diet.

Recurrent Exertional Rhabdomyolysis (RER) is another form of tying-up. Horses suffering RER are frequently fillies, and tend to be nervous horses. Starch feeding and excitement are both implicated as 'triggers' in RER, hence partial replacement of grains with oil in the diet may aid in the management of the condition.

5. Glycogen

Once adapted to higher levels of dietary oil, horses can utilise oil for energy during submaximal/aerobic[1] exercise. This is achieved via fatty acid oxidation and has the effect of sparing muscle glycogen[2] stores.

Subsequently, horses appear able to utilise the greater muscle glycogen stores during high intensity/anaerobic[3] activity. This phenomenon has implications such as delaying time to onset of fatigue and increasing capacity for high intensity exercise.

6. The benefits of supplemental oil for horses, extend beyond its use merely as a grain alternative. Oil-supplementation can help prevent fizzy behaviour and various types of tying-up, and reduce the thermal load on horses in hot climates. Oil feeding can even provide energy for submaximal work and may increase capacity for high intensity exercise. High oil feeds such as Cool Fuel are a palatable and no-mess way of providing horses with supplemental oil and gaining the subsequent advantages associated with oil-feeding.

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[1] **Submaximal/aerobic exercise** is associated with heart rates <160 beats per minute and does not result in reliance on anaerobic energy production.
[2] **Glycogen** is the form in which animals store carbohydrates in their bodies, for later use as energy.
[3] **High intensity/anaerobic exercise** occurs at heart rates >160 beats per minute. During anaerobic activity the horse derives some of its energy via processes that do not require oxygen (i.e. anaerobic energy production).