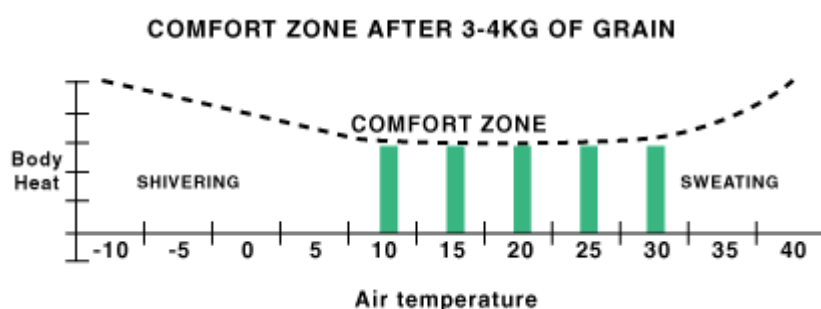


## What is 'Heat'?

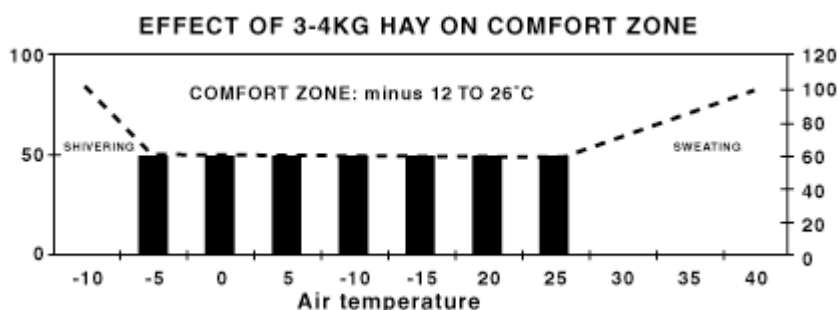
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There are two types of **OVERHEATING** and both are caused by fermenting hard feed.

1. **Body Heat:** when feed ferments in the large intestine it produces heat. This heat helps maintain body temperature. When the environmental temperature is between about 16 °C and 36 °C horses are able to maintain a steady body temperature, without needing to shiver to keep warm or sweat to cool. If they are fed 3-4kg of grain, the heat generated during digestion allows them to tolerate temperatures as low as 12 °C without shivering, but at around 32 °C they will begin sweating due to the extra body heat generated during digestion.



When fed 3-4kg of hay, the heat produced during fermentation of the fibre allows them to maintain body temperature without needing to shiver, down to temperatures as low as minus 12 °C. However, this extra body heat means they will begin to sweat at around 26 °C.



In hot climates, the amount of heat produced during digestion can affect performance. To cool itself by sweating, the horse must divert a large volume of blood to the skin. As body temperature rises, the horse diverts more and more blood to the skin - taking it away from the muscles. This reduces muscle blood flow and contributes to muscular problems during exercise, and increasing fluid and electrolyte losses.

Certain dietary manipulations can keep the heat of digestion to a minimum. When hard feed is fermented in the caecum, it produces ammonia, acid, heat and gas - increasing sweating, nervousness and predisposing to tying up, colic, diarrhoea and laminitis. Digestion in the small intestine produces much less heat than fermentation in the caecum and large intestine. By using feeds that are well digested in the small intestine, heat stress can be minimised. Micronization, steam extrusion and feeds containing 10-12% oil have been shown to increase digestion of raw grains in the small intestine from 20-30% to over 90%.

2. **Heat and behaviour:** fermentation of hard feed in the large intestine yields acid and ammonia. Both of these chemicals irritate the nervous system, causing *behavioural problems* such as fizzy, restless, unpredictable or 'hot' behaviour. Acid and ammonia also predispose to overgrowth of bacteria in the gut,

which can lead to gastrointestinal diseases, laminitis, tying up and other veterinary emergencies. Many of these conditions may be subclinical, that is - vague syndromes of shifting, intermittent lameness, sour-smelling manure, poor performance or being 'just not quite right'.

## WHAT CAUSES OVERHEATING?

- ***a horse is fed more energy*** than required.
- ***a horse is fed too much protein*** which ferments to ammonia and energy, irritating the gut and nervous system and adding to the energy already in the diet. If a lot of lucerne is fed, protein levels can become too high.
- ***feed is not fully digested*** oats and sunflower seeds growing in manure show that horses are not able to fully digest raw feed
- ***fizzy behaviour*** can also be caused by vitamin B and mineral deficiencies.

## WHAT IS A 'COOL' FEED?

A '**cool**' feed must reduce heat production. The **only** way to reduce heat production is to increase digestion in the small intestine. The **only** way to increase digestion in the small intestine - to over 90% - and still meet energy requirements is with the most advanced feed processing methods - **micronization** and **pressure cooking and steam-extrusion**. These processes combine, advance and fine-tune the time-honoured processes of grinding, cracking, crushing, cooking and pelleting. Representing the most recent advances in feed cooking techniques, micronization and steam-extrusion shift the the site of digestion back to the small intestine - where nature meant it to be. Combining basic principles that have stood the test of time with the results of the latest Australian and international research, **Mitavite** is the only company producing micronized and steam extruded concentrates and complete feeds - ***taking the heat out of feeding.***

For further information on feeding horses please fill in our ***nutrition advice form.***

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