

CHAPTER 7

Feeding grain to cattle



This chapter looks at the precautions that need to be taken when feeding grain to cattle.

Key messages

- **Grain can be a cost-effective source of energy in drought rations.**
- **Introduce cattle to grain gradually.**
- **Ensure roughage (fibre) levels are adequate.**
- **Buffers will reduce the risk of grain poisoning (acidosis).**
- **Processing (such as cracking or rolling) can markedly increase the grain's energy availability.**
- **Monitor grain fed cattle carefully for signs of acidosis.**

Grain is a common supplementary feed during a drought. It can have higher energy and protein levels than hay, making it an attractive supplement for animals that have higher nutritional requirements, such as young growing stock or cows and calves.

There are some risks when feeding grain to cattle, but they can generally be minimised by careful management.

Introducing cattle to grain

Take care when introducing cattle to a grain ration to avoid potential grain poisoning (acidosis).

Grain contains high carbohydrate levels and should be introduced gradually so the bacteria in the animal's rumen have time to adapt to the new feed. Shy feeders and younger animals may need to be separated from more dominant animals to reduce uneven consumption.

Cattle should be accustomed to being fed with hay before grain is introduced to the ration. The hay can then be reduced over 2-3 weeks, as the amount of grain in the ration is increased. Importantly, roughage (hay, straw or dry pasture) should always make up 30% of the total ration.

Where there is some roughage left in the paddock, the amount of hay in the ration can be reduced accordingly. Once paddock roughage is depleted, however, some hay will have to be fed.

Introduce grain by feeding 0.5 kg/head/day. Maintain this amount until all cattle are eating some grain (1-3 days). During the initial feeding, place the grain on top of the hay to ensure animals consume some roughage.

Increase the amount of grain by 0.5 kg/head every second day until the desired amount in the ration is reached.

Watch closely for sickness and other health problems when feeding grain, particularly during the introductory phase.

Symptoms of grain poisoning (acidosis) include reduced or absent appetite, weakness, staggering, diarrhoea, bloat and lameness. In severe cases, the animal can become dehydrated and may be unable to stand. Severely affected animals should receive veterinary treatment, while more moderately affected animals should be removed and fed a hay-only diet until they appear healthy. These animals can be re-introduced to grain using the same principles applied during the initial introduction.

Frequency of feeding

Feed cattle daily during the build-up of grain rations. As soon as cattle are on a full ration and accustomed to eating grain, feed every second day (ensuring twice the daily quantity is supplied).

Experience has shown that every two days is about the longest acceptable feeding interval. Early weaned animals in poor condition or animals being fed for weight gain should be fed daily.

How to feed – trough or on the ground?

It is best to feed grain in troughs to prevent wastage and minimise intake of soil. Various forms of troughs can be improvised. For example, two rows of logs can be placed on the ground about 450-600 mm apart and joined with old corrugated iron as flooring. Other options include 200 litre drums split down the middle or tractor tyres cut in half.

If the grain is fed out on the ground, place the grain in heaps rather than trailing it out.

Feeding processed grain (rolled or crushed) on the ground is not recommended, as too much is likely to be wasted.

Changing a ration

Take particular care when changing sources or batches of grain, particularly changing from one type of grain to another, e.g. barley to wheat. The new batch of grain ideally would be 'shandied' together with the old batch for about a week. If it is not possible to mix the two grains together for a week, the rate of feeding of the new type of grain should be halved and gradually increased back up to target levels by increasing the rate of feeding by 0.5 kg/head/day.

Roughage (fibre)

Roughage (dry paddock feed, hay, straw, etc) is a key ingredient in drought rations for healthy rumen function. It should make up at least 30% of a ration.

When grain is the source of energy and protein in a diet, the roughage need not be of a high quality. Often straw and low-quality hay will suffice. Around 30% neutral detergent fibre (NDF) is an ideal amount of fibre in a diet. The NDF level of a ration can be determined from a feed analysis.

Other grain additives

Where grain makes up most of an animal's daily ration, 1% (1 kg/100 kg of grain) of ground agricultural limestone should be added to the ration. This makes up for a shortage of calcium in the grain.

For lactating or young animals on grain rations, 1% (1 kg/100 kg of grain) of common salt (sodium chloride) should be added to correct a potential sodium deficiency.

Processing grain

Feeding processed (cracked or rolled) grain to cattle has significant nutritional benefits compared to whole grain. Table 7.1 illustrates the impact of processing on the digestibility of wheat, barley, oats and lupins.

A kilogram of processed grain will provide more energy to an animal than a kilogram of whole grain.

Table 7.1: Digestibility of whole versus processed grain.

	Whole % digestibility	Processed % digestibility	Increased digestibility from processing
Wheat, Triticale	63	86	36%
Barley	53	85	60%
Oats	77	81	5%
Lupins, Peas	76	86	13%

(Reference: Toland, P.C. (1976) *The digestibility of wheat, barley or oat grain fed either whole or rolled at restricted levels with hay to steers*. AJEAA 16: 71-75)

Deciding whether to process grain for cattle depends on several factors:

- The grain used: Processing markedly increases the digestibility of wheat and barley, whereas the digestibility of oats and lupins is only slightly increased.
- The availability of equipment to process grain and at what cost: The coarse crush achieved with a roller mill is superior to the dusty result from a hammermill.
- Ease of feeding: Whole grain can be fed on the ground; crushed grain should be fed in troughs.
- Grain poisoning: Where grain is fed separately from roughage, whole grain is considerably safer to feed than crushed grain. When grain is mixed with chopped roughage however, crushed grain can be fed more safely.

Grain poisoning

Grain poisoning, or acidosis, is the main problem associated with feeding grain to cattle.

Grain poisoning occurs when the digestion of sugars and starch in the feed cause a rapid accumulation of acid in the rumen. If the acid accumulates faster than the body can handle there will be reduced rumen function and potentially a loss of important rumen bacteria.

Severe acidosis will result in death, while milder cases will cause a loss of appetite and production.

The type and treatment of grain will influence its potential to cause grain poisoning. Whole grain is less likely to cause grain poisoning than processed (crushed or rolled grain) of the same type, such as barley. Coarsely crushed grain is less likely to cause grain sickness than finely crushed grain. Fibrous grains, such as oats, are safer to feed than grains with little fibre, such as wheat. A feed analysis will indicate the level of fibre a ration or feed contains.

A number of measures can be taken in addition to the controlled introduction of grain into a ration to minimise the threat of grain poisoning.

Grain poisoning – or lactic acidosis – can result from:

- introducing cattle too quickly to high levels of grain, or feeding too much grain too soon
- insufficient trough space or feed area resulting in aggressive cows overeating
- changing from a lower energy grain to one of higher energy (for example, changing from oats at 10 MJ ME/kgDM to wheat at 13 MJ ME/kgDM, is a 30% increase in energy; sometimes different batches of the same type of feed will cause problems)
- feeding grain-based pellets, which are usually 90% processed grain; when introducing them to cattle take the same precautions as when feeding grain
- insufficient roughage fed with grain
- insufficient access to roughage by shy feeders
- accidents – storage areas are not sealed to prevent stock access.

Treatment for grain poisoning depends on the severity of the symptoms shown:

- mild lactic acidosis – still eating, mild bloat, with or without porridgy faeces
- moderate to severe lactic acidosis – not eating, porridgy scours, obviously sick with dehydration evident
- severe lactic acidosis – down and unable to rise, dehydration, watery scour.

Treatment of grain poisoning may involve a range of responses:

- Mild lactic acidosis may simply require removal of grain feeding, a drench with 120 g of sodium bicarbonate orally and hay feeding only.
- Severe acidosis will require intensive veterinary attention; contact your local veterinarian.
- As with many animal health issues, prevention is better than cure. Adding a buffer such as sodium bicarbonate or sodium bentonite to a grain-based ration reduces the likelihood of grain poisoning.

Buffers

Buffers are chemicals that counter the acidity of grain in the rumen and help to prevent grain poisoning.

To reduce the risk of grain poisoning during the introductory period, add 2% (2 kg/100 kg of grain) of either sodium bicarbonate or sodium bentonite to the grain being fed out with roughage. After one month of feeding grain the amount of buffer can be reduced to 1%.

Other grain feeding problems

Calcium deficiency

Feeding grain over a prolonged period can result in calcium deficiency due to the low calcium and high phosphorus levels in grain. This is overcome by adding ground limestone to the feed (up to 1.5% of the ration by weight).

Vitamin A deficiency

Vitamin A deficiency can occur after a prolonged shortage of green feed. This is unusual in southern Australia as sufficient Vitamin A can be stored in the liver to satisfy animal requirements for at least six months. A Vitamin A, D and E injection can be given to prevent this problem.

Urolithiasis

Urolithiasis (bladder and urinary stones) can be a problem in steers fed grain for long periods.

Addition of ground limestone balances the excessive phosphorous levels likely to predispose cattle to this condition. Adding 1% salt to the ration will encourage higher water consumption, thus reducing the risk of urolithiasis problems.

Polioencephalomalacia

Polioencephalomalacia (PEM) occurs due to an induced deficiency in thiamine (Vitamin B1). It can occur in feedlot cattle and cattle on high-concentrate diets, especially when minimal roughage is available. Typical signs include blindness, aimless wandering and a 'star gazing' appearance. Seek veterinary attention for diagnosis and treatment.