

Using oats as an alternative grain in opportunity feedlot rations

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Warning: chemical residues

Some sources of fodder have been linked with an increased risk of chemical residues in slaughter animals. While most problems have been linked to persistent chemicals such as the organochlorines (OCs), any chemical contaminant in feed can cause unacceptable residues in livestock products if present in sufficient concentration. Residues can persist for a variable time after feeding of contaminated material ceases. The time taken for residues to clear varies greatly, depending on factors such as the chemical involved, the level in the feed, the duration of feeding and changes in the animal's body weight and condition.

Producers should check with suppliers as to what chemicals the feed has been or may have been exposed to during its production, harvest, storage, processing and transport. If the feed has been raked and baled in the field or if it may contain soil, additional assurances should be sought that it was harvested from land which had no previous applications of persistent OCs.

When purchasing any feed, producers are advised to:

- inform the seller what they are purchasing the feed for
- inquire whether the feed is suitable for that purpose
- inquire if any chemicals have been applied to the feed, or if there are any chemical residues in the feed, or if the feed is 'free of unacceptable residues'.

Further information can be sought from your local NSW DPI office and [Primefact 312 Drought increases residue risks](#).

Introduction

Grain feeding is becoming a more common production method for producers finishing cattle for either the export or domestic market. While the majority of cattle are fed in established feedlots, many are also finished in on-farm opportunity feedlots.

On-farm opportunity feedlots are also a valuable option for finishing stock during dry periods, or for capitalising on an opportunity to target a specific market (see *Opportunity Lotfeeding of Beef Cattle* www.dpi.nsw.gov.au/reader/lotfeeding).

Note: the feedlot must be registered with AUS-MEAT (www.ausmeat.com.au) in order to obtain a grain-finished price.

One of the more significant costs in feedlot operations is the feed cost. Feed prices depend upon availability and suitability of feed grains. Identifying the suitability of grain for lotfeeding allows greater flexibility in the selection and purchasing of grains that will provide the greatest return on the feeding operation.

Suitability of oats for feedlotting

Oats are a common cereal grain grown throughout central and southern NSW. While not often used as a grain in feedlot rations, the performance of cattle that are fed oats is equivalent to performance when cattle are fed other more commonly used grains.

Oats have a slightly lower energy range than most other grains. They have a high fibre content, and are considered a safer grain to feed than either wheat or barley.

When trialled experimentally, oats-fed cattle consumed similar amounts of grain to barley-fed cattle.

Table 2 shows the results of a trial conducted at the Beef Quality Cooperative Research Centre, Tullimba Feedlot.



Table 1. Properties of various grains

Foodstuff	Dry matter (DM) (%)	Starch (%)	Metabolisable energy (ME) (MJ/kg DM)		Crude protein (CP) (% DM)	
			Average	Tested range	Average	Tested range
Oats	90	50	10.5	8.5–12.5	10.5	8–12
Barley	90	59–61	13	12.5–13	11	10–12
Wheat	90	60–76	13	12.5–13.5	12	11–13
Sorghum	90	75	13	12.5–13	9	5–11
Maize	90	76	13.5	13–14	9.5	9.0–10

Source: NSW Agriculture Feed Service Data Base.

Table 2. Feedlot performance (117 days)

	Barley*	Oats*
Daily feed intake (kg)	13.50	13.42
Average daily gain (kg/day)	1.39	1.35
Feed conversion ratio (kg DM / kg LW)	9.72	10.02

Source: Bird S. 1998. Compiled from 'Oats as an Alternative Grain for Lotted Cattle', CRC News, February 1999.

* Barley: 75% barley, 10% roughage, Oats: 80% oats, 5% roughage.

These results show that when daily feed intake is similar between animals fed either barley or oats, importantly there is a strong similarity between their average daily gains (ADG) and their feed conversion ratios (FCR).

Preparation of oats

The ideal method of preparing oats is dry rolling, utilising a roller mill. Dry rolling does not smash the grain. This ensures that there is less dust

produced, which could later cause respiratory problems. Other options may include hammermilling grain, but care needs to be taken if using this method to process grain as it may pulverise the grain rather than crack it. To avoid this occurring, the correct screen size should be used – a suggested screen size for oats is 6–8 mm.

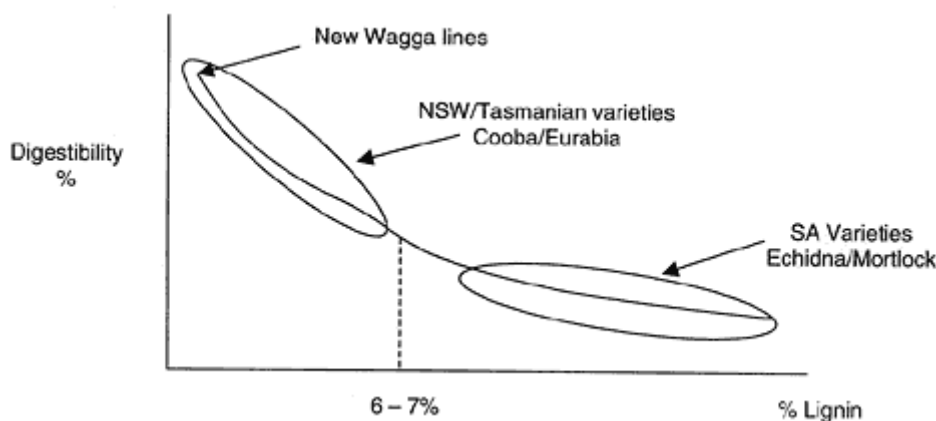
Sourcing oats for feeding

Oats are a cereal grain commonly grown throughout central and southern NSW and Victoria. Oats are generally available through grain traders and feed suppliers; there are also supplies of privately traded grain available.

Figure 1: Notes:

- Lignin at 6–7% is the cut-off for higher digestibility.
- An oil content study has shown that oats can have an oil content of up to 12%! The higher the oil content of the oats, the higher the digestibility, and hence the higher the energy level provided.
- High hull digestibility means better starch utilisation and better liveweight gain.

Figure 1. Oat hull digestibility for various oat varieties



Source: Kaiser A. 1999, unpublished. Wagga ARI GRDC Feed Grains Project

Oat hull digestibility

Oat hull digestibility varies considerably, depending on the variety. Oat varieties bred by NSW Department of Primary Industries and the Tasmanian Department of Primary Industries, Water and Environment are now known to have higher hull digestibility than varieties bred by the South Australian Department of Primary Industries and Resources. This is because NSW and Tasmanian breeders selected for both grazing and grain attributes rather than for grain attributes alone.

Balancing an oat-based grain ration

Oats can be variable in metabolisable energy (ME), ranging between 11 and 13, and can be expected to test between 10% and 11% crude protein.

Protein supplements

Like most cereal grains, oats need a protein supplement to lift the crude protein in the ration to the 13–15% crude protein range required by young rapidly growing/finishing cattle. A protein test (which is quick and cheap) will help to determine the amount of protein you need to add. Enquiries about the protein test can be made to:

- your nearest regional GrainCorp office
www.graincorp.com.au/bins/content_page.asp?cid=9
- Feed Quality Service
NSW DPI
Locked Bag 701
Wagga Wagga NSW 2650
Ph: 1800 675 623
www.dpi.nsw.gov.au

There are a variety of protein supplements you may choose from in order to balance the ration. In every case it is important to consider the costs of adding a supplement and to compare the costs against other sources of protein. Your choice of protein supplement will be from:

- urea (a non-protein meal – if you use urea include it at no more than 1.5% by weight of the ration)
- protein meal
- grain legumes.

Urea

See the warning on the use of urea below. Adding urea is by far the cheapest method of increasing the protein content of the ration. It is suggested that urea be included in the ration as a matter of course at the standard rate of 1% by weight, and any further deficiency of protein in the ration be corrected by adding one of the other protein sources as mentioned above. Urea contains the equivalent of 287% crude protein. Adding 1% urea by weight to oats lifts the crude protein by 2.8% (Table 3).

If you are using urea, then follow these rules:

- Use only stockfeed-grade urea and **not** fertiliser urea.
- Roll or hammermill the oats (6–8 mm screen).
- Know your ration weights.
- Weigh urea accurately.
- Mix urea well.
- Start off by adding 0.5% urea by weight (5 kg/tonne) for 1 week then increase to 1%.

Warning on the use of urea

Urea is toxic if fed in excess, and inexperienced operators should not attempt to use more than 1% in their ration. Urea must be thoroughly mixed in the ration. Always use prilled and not granulated urea.

If urea is added to the feed in a powder form, and trough cleaning is inadequate, urea may settle to the bottom of the feed bunk. If the trough is not emptied for several days and cattle then eat it out, there is a danger of individual animals eating excessive quantities of urea. This can be lethal.

For further information, see 'Urea poisoning' in *Cattle health in feedlots*,
www.dpi.nsw.gov.au/reader/lotfeeding

Plant protein meal

Your common choice will be from:

- cottonseed meal
- canola meal
- soyabean meal
- linseed meal.

Table 3. Increasing the protein level of an oats grain ration

Protein level of initial oats grain ration	Protein level after addition of 1% urea	Additional protein requirement to 15%	Additional protein source	
			Meal	Lupins
10%	12.8%	2.2%	6–8% (depending on crude protein levels)	7–8% (lupins may have up to 30% crude protein)

These meals have a crude protein range between 32% and 44%. This means that if the oats are:

- at 10% CP, then adding 15–22% by weight of one of these meals will boost the crude protein of the ration to 15%
- over 10% CP, they will need only 18% by weight protein meal
- under 10% CP, they will need up to 30% by weight protein meal.

Grain legumes

The common grain legume is lupins (broadleaf or narrow leaf). Lupins are an ideal protein addition to an oat ration because:

- they are rumen friendly (low starch)
- they provide rumen protein
- they do not compromise energy in the subsequent two-grain mix.

Table 4 gives the amount of lupins that needs to be added to the oats, depending on the tested protein content of the oats.

Table 4. Amount of lupins (30% CP) to increase ration protein content

Protein level of oats	Calf ration (under 200 kg) 16% CP	Vealer ration (250 to 350 kg) 14.5% CP	Yearling ration (over 350 kg) 13% CP
8	36%	30%	23%
10	30%	23%	15%
12	22%	14%	6%

Mineral supplements

A mineral supplement can be used at manufacturer's recommendations.

Rumen modifiers

Oats generally do not cause acute acidosis (grain poisoning), so you do not need to add any antibiotic-based rumen modifiers when feeding oats.

Comparing the cost of grains

When purchasing oats, or any feed, base your purchase on kilograms of dry matter (kg DM) rather than by volume or per unit. You can then accurately compare feeds, as well as design rations based on animals' requirements.

When purchasing grains, base your decision on landed cost per unit of energy or protein, depending on the reason the grain is to be fed.

Feed costs can be calculated and compared using

- the feed cost calculator www.dpi.nsw.gov.au/reader/choosing-feeds/dai201b
- [Primefact 356 Feed cost calculator instructions.](#)

Conclusion

Oats should be viewed as a valuable grain, which can be used for finishing cattle to market specifications. The greatest opportunity for using oats may be during times of grain shortages, or when prices for other more commonly used grains are high.

Knowledge of the usefulness of oats may help in the selection of a cheaper but no less efficient feeding option.

Further information

Further information on feeding oats may be obtained from the following publications:

- Opportunity Lotfeeding of Beef Cattle www.dpi.nsw.gov.au/reader/lotfeeding
- [Primefact 275 Hand feeding cattle in drought – grain](#)
- or contact your nearest NSW Department of Primary Industries Livestock Officer (Beef Products).

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ISSN 1832-6668

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (November 2007). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

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