

Fact sheet

FEEDLOTS

How can feedlots reduce emissions?

Ways to reduce methane

The feedlot industry is well positioned to lead the way for emission reduction strategies as it is a very precise, efficient and controlled environment. Some of the most promising research and technologies involves feed additives that may reduce methane emission from cattle. These lend themselves to being easily incorporated in the diets of lot fed cattle and can immediately benefit the Australian red meat and livestock industry.

There are several ways to reduce methane emissions from cattle.

Currently available feed additives

Dietary oil

Feedlot rations typically include up to 7% fats and oils on a dry matter basis. Inclusion has been shown to reduce methane emission by 4.9% for every 1% increase in oil or fats in the ration (see Table 1). It is important to note dry matter intake may be suppressed in rations above 10% fat content.

Monensin

Monensin is a naturally occurring ionophore antibiotic widely used as a rumen modifier for preventing rumen acidosis in cattle fed high concentrate diets.

There are four mechanisms for methane reduction by monensin:

- Monensin reduces methane production by reducing dry matter intake (DMI) by 5–6% and increasing feed conversion efficiency, reducing lifetime methane per kilogram of beef.
- Monensin promotes the selection of succinate forming and propionate forming bacteria to produce propionate.
- Monensin inhibits the release of H₂ from formate, selectively reducing acetate formation.
- Monensin also limits the survival of protozoa.

Prospective feed additives

Asparagopsis

A type of red microalgae that has been shown to reduce methane emissions (see Table 1).

3-nitrooxypropanol (3-NOP; trade name Bovaer®)

A synthetic product being developed as a feed supplement which inhibits the last step of methane production in the rumen of cattle (see Table 1).

Dietary nitrate

A recognised methane mitigation compound, however, caution is needed with respect to toxicity. Currently grazing cattle fed nitrate can generate carbon credits.

Defaunation

Changing the composition of microorganisms in the rumen using certain supplements has shown to reduce methane emissions. However, no supplements are commercially available at present.

Herd management

Finishing cattle on grain base rations increases daily weight gain and decreases feed conversion ratio and methane emissions, resulting in lower lifetime emission rates. Coupled with backgrounding on partial grain rations there is an opportunity to further reduce lifetime emissions.

Hormonal growth promotants

These are commonly used to increase feed conversion efficiency and growth rates that reduce the time the animal is on feed and age at slaughter.

Genomic selection

Potential to create estimated breeding values (EBVs) to facilitate genetic selection as methane emissions have been shown to be heritable and repeatable.

Manure management

Contributes around 1–2% of carbon footprint of finished feedlot cattle. There may be potential to improve manure management to reduce methane emissions but this requires more research. Contamination with soil and high moisture content limits energy production options from feedlot manure.



Image: Australian Lot Feeders' Association

Table 1: Methane mitigation potential of several prospective feed additives

Feed additive	%	Units	Mitigation potential	Reference
Asparagopsis	0.10%	% of DMI	9%	(Kinley <i>et al.</i> 2020)
Asparagopsis	0.19%	% of DMI	38%	(Kinley <i>et al.</i> 2020)
Asparagopsis	0.39%	% of DMI	98%	(Kinley <i>et al.</i> 2020)
3-NOP	0.010%	% of DMI	26%	(Vyas, McGinn, <i>et al.</i> 2018)
3-NOP	0.015%	% of DMI	33%	(Vyas, McGinn, <i>et al.</i> 2018)
3-NOP	0.020%	% of DMI	45%	(Vyas, McGinn, <i>et al.</i> 2018)
Dietary oil	1.000%	% increase in total dietary oil	4.9%	(Grainger and Beauchemin 2011)*
Dietary oil	2.000%	% increase in total dietary oil	9.8%	(Grainger and Beauchemin 2011)*
Dietary oil	3.000%	% increase in total dietary oil	14.7%	(Grainger and Beauchemin 2011)*
Dietary oil	4.000%	% increase in total dietary oil	19.6%	(Grainger and Beauchemin 2011)*

Rewards for businesses that reduce emissions



Consumer and community support

- increased community support
- maintained consumer demand
- increased value of Australian red meat.



Market access

- access to high value markets (such as the EU).



Access to capital

- access to funding
- lower cost of capital.



Limit regulation

- reduced risk of state of federal government regulatory intervention.



Climate resilience

- improved adaptation enabling ongoing productivity.

Five things feedlots can do today to work towards a carbon neutral future

1. Identify emissions sources, start collecting data and document these in a carbon account.
2. Consider [energy efficiency](#) or renewable energy technologies to reduce fossil fuel use.
3. Review currently available feed additives and diet formulations to see if these can be optimised for reduced methane emissions.
4. Plan for delivery and distribution of new feeds and supplements that reduce methane emissions, and improve animal growth rate.
5. For animals during backgrounding – establish deep rooted, palatable pastures and legumes to improve soil carbon levels and increase productivity.

More information

Read the *Moving towards carbon neutrality – Opportunities for the feedlot industry* technical manual.