

Preventing facial eczema in milking cows using zinc oxide in feed

Zinc is protective against facial eczema. It prevents cell damage by forming an inactive complex with the toxin sporidesmin.

It also inhibits intestinal absorption of copper which catalyses formation of the oxygen free radicals that cause the cell damage.

Zinc supplements can be effective for facial eczema control and prevention if well managed, as the data in the figure below demonstrate.

Whichever option is used for zinc administration (zinc sulphate via drinking water, or zinc oxide by oral drench or in feed), the aim is to maintain the cow's blood serum zinc level at 20 to 35 micromoles/litre.

The desired dietary intake of **elemental zinc** required when 'prevention dosing' to maintain this protective blood serum zinc level is **20 mg/kg liveweight/day**.

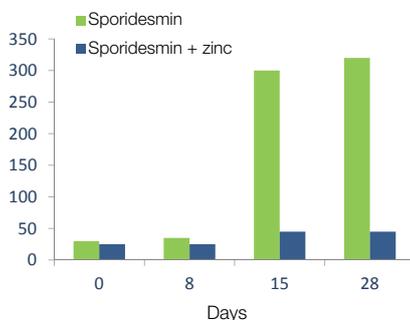


Figure 1. Serum GGT in sheep fed sporidesmin with and without zinc.
Source: Towers & Smith (1978)

Zinc administration should commence 2-3 weeks before pastures become toxic.

Feeding zinc oxide in grain/concentrates (as a grain mix or pellet) in the bail at milking can be very effective for facial eczema prevention in the milking herd on Australian dairy farms. However, only a suitable zinc oxide additive should be used, in the correct amount.

The concentration of elemental zinc and the level of impurities (including lead, cadmium and other heavy metals) varies between different zinc oxide additives. Only a zinc oxide additive with a certificate of analysis provided by the supplier which confirms it is suitable for use in animal feeds, containing no more than 200 mg/kg (0.02%) lead and 20 mg/kg (0.002%) cadmium, should be used.

The amount of zinc oxide included in each tonne of grain/concentrate for 'prevention dosing' must be carefully calculated to achieve the required dose of 20 mg elemental zinc/kg liveweight/day. If you *under-dose*, you will not provide your cows with adequate protection against high exposure to sporidesmin challenge. If you *over-dose*, there is the risk of zinc toxicity.

Problems supplying zinc oxide via grain/concentrate (as a grain mix or pellet) most often occur when:

- The incorrect zinc oxide inclusion rate per tonne of grain/concentrate is used for the daily feeding rate and average milking herd liveweight.
- The zinc oxide settles out of the grain/concentrate before or during feeding.

- Each cow does not receive and consume the intended amount of grain/concentrate (kg/cow/day) in the dairy bail.
- The grain/concentrate feeding rate is changed mid-batch.

While there is no research to support any maximum safe zinc supplementation period, be it 60, 80 or 100 days, experience in New Zealand over 40 years provides confidence that when administered correctly, prevention dosing is safe up to 100 days. Beyond 100 days, monitoring blood serum zinc levels in conjunction with a vet becomes more important.

Remember that by the time you see some cows in the herd affected by the photosensitisation caused by facial eczema, a large proportion of the herd is likely to have already suffered liver damage, for which there is no specific treatment. (Zinc can only prevent facial eczema. It cannot reverse liver damage already done from exposure to the toxin).

Early intervention is critical. Use prevailing weather conditions in combination with pasture spore counting to predict and identify periods of pasture toxicity, and take preventative action when local pasture spore counts trend upward of 20,000 spores/gram and weather conditions look favourable for sporulation.

Gippsland farmers can keep track of local pasture spore counts via the **Dairy Australia facial eczema pasture spore monitoring program** at www.dairyaustralia.com.au/facialeczema

Checklist for zinc oxide supplementation in feed

Use this checklist and work closely with your stockfeed supplier, vet and nutrition adviser to ensure your zinc supplementation program is effective and safe.

Zinc oxide additive used

- Only use a pelleted zinc oxide additive in a distinctive, well labelled bag with a certificate of analysis provided by the supplier which confirms it is suitable for use in animal feeds, containing no more than 200 mg/kg (0.02%) lead and 20 mg/kg (0.002%) cadmium

Zinc dosage

- Measure your herd's average liveweight
- Ensure the range of cow liveweights in your herd is not too wide. (A range of less than 150kg between your lightest and heaviest cows is desirable)
- Set your daily grain/concentrate feeding rate (kg/cow/day)
- Calculate the zinc oxide inclusion rate (kg/tonne feed) required to provide 20 mg elemental zinc/kg liveweight/day, based on your herd's average liveweight and daily grain/concentrate feeding rate

Feed manufacture / farm delivery

- Ensure your stockfeed supplier is FeedSafe® accredited
- Ensure you receive a delivery docket and 'fit for purpose' statement for every load of feed delivered by your stockfeed supplier, and check details
- If mixing your own feed on farm, check that your mixer or additive dispenser is well maintained, disperses the zinc oxide uniformly in the grain/concentrate, and is correctly calibrated
- If feeding a grain mix, include a pelleted zinc oxide additive (not a powder)
- Clearly label all your farm silos
- Ensure the blower pipe on your silo directs feed downwards, not against the inside wall

Administration of feed to cows in the dairy

- Ensure an individual bail is provided for each cow
- If you have a computerised feeding system, do not use it to feed individual cows based on their milk production while using zinc oxide. However, if you have a wide range of cow liveweights in your herd e.g. you have both Holstein-Friesians and Jersey cows, you could use a computerised feeding system to more precisely dose cows of different liveweights with zinc
- Check to ensure the correct quantity of feed is consistently dropped in all bails
- Regularly clean bails if there is excess residual feed
- Regularly check your actual versus expected feed usage
- Don't change your daily grain/pellet feeding rate (kg/cow/day) until a new load of feed is made/delivered
- Don't feed the milker grain/concentrate to young stock
- Monitor the effectiveness of your zinc supplementation program with your vet using blood samples from at least 10 cows
- Check for any early signs of zinc toxicity
- Consult your vet if you wish to feed zinc for longer than 100 days

Special Edition Fact Sheet produced by the Dairy Australia Facial Eczema Working Group

For more information on facial eczema, go to:

www.dairyaustralia.com.au/facialeczema and download the Facial Eczema booklet.

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