Prevent 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 between 20 and 35 micromoles/litre. The desired dietary intake of elemental zinc required when ‘prevention dosing’ to maintain this protective blood serum zinc level is 20mg per kg of liveweight per day.

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 per cent) lead and 20mg/kg (0.002 per cent) 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 of elemental zinc per kg liveweight per 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.

Figure 1 Serum Gamma-Glutamyl Transferase (GGT) in sheep fed sporidesmin with and without zinc

GGT a is type of enzyme predominantly used as a diagnostic marker for liver disease.

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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.

It is now recommended to test a blood serum sample from 10 random cows three to four weeks after beginning supplementation of your herd with zinc oxide. This is to ensure that cow’s are achieving a zinc level in their blood serum between 20 to 35 mmol/litre. Recent data from Gippsland across over a dozen farms has shown that despite supplementing zinc oxide according to the guidelines described here, many farms are still not achieving sufficient levels of zinc in blood serum of cows, regardless of the method of supplementation used. 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.

Early intervention is critical to prevent facial eczema. Exposure to the toxin sporidesmin can cause liver damage to a large proportion of your herd before you can detect photosensitisation related to facial eczema. Zinc can prevent damage caused by the sporidesmin; however, it cannot reverse liver damage in cows.

Monitor weather conditions and pasture spore counting to identify periods of pasture toxicity. Take preventative action when local pasture spore counts trend upward of 20,000 spores/gram and weather conditions look favourable for sporulation (Warm conditions and high humidity levels between mid-summer and late autumn).

FOR FURTHER INFORMATION

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

For further information please visit feed.dairyaustralia.com.au

CHECKLIST FOR ZINC OXIDE SUPPLEMENTATION IN FEED

Use this checklist and work 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 per cent) lead and 20 mg/kg (0.002 per cent) cadmium

Zinc dosage

• Measure your herd’s average liveweight to accurately calculate the zinc dosage required.
• 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 of elemental zinc per kg liveweight per 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 feeding a pelleted ration to the milkers, ensure that zinc oxide is incorporated in the feed pellet for the required timeframe.
• 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 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