

You are encouraged to discuss this guidance with your veterinary and nutritional advisers.
This leaflet aims to outline some practical advice on the use of copper in feed for bovines on farms in the UK.

Background

Copper is an essential trace element for animals. Copper toxicity resulting from over-supplementation is becoming a more common condition in cattle, especially dairy cows. While there may be several sources of copper in the diet that individually are not in excess, together they can cause copper toxicity. This has prompted an industry-led working group to investigate the causes of copper toxicity in cattle. There is some uncertainty regarding the incidence of copper over-supplementation in dairy cattle. Nevertheless, the aim of this guidance note is to provide clear and practical advice about copper supplementation and associated legislative requirements.

Maximum Permitted Level (MPL) of copper in cattle feed

EU Regulation 1831/2003 on additives in animal feed sets the MPL for copper in cattle feed at 35 mg/kg (ppm) at 88% dry matter (DM), which equates to 40 mg/kg on a dry matter basis. Supplementation at levels greater than this can only be undertaken after a full risk assessment and by written prescription by the veterinary surgeon responsible for the animals. The MPL is based on the complete feed and should include inputs from complementary feedingstuffs such as boluses or licks, but does not include input from water.

Copper requirements – factors to consider

Copper uptake from the diet

The uptake of copper by ruminants is variable.

- Antagonists such as sulphur, iron and molybdenum can reduce copper availability to varying degrees. Soil, certain diets and water may all contain antagonists.
- Estimating copper availability in the presence of antagonists has largely relied on calculations derived from sheep experiments extrapolated to cattle. Use of these models should be minimised to avoid confusion and to reduce the risk of inadvertent over supply.
- Organic forms of copper may have different bioavailabilities than inorganic forms and therefore consideration should be given to the form of copper used.

Nutritional requirement of copper in cattle

Under normal conditions, and in the absence of significant antagonists, total copper in the total ration should typically be 20 mg/kg DM.

Managing copper supplementation

Copper supplementation should be managed by farmers, nutritional advisers and vets on a case by case basis.

Consideration of age and pregnancy status

Young calves are more susceptible to copper poisoning than adult cows. Pregnant cows divert copper to the foetus. Copper supplements must be used with care with pregnant cows in order to avoid excessive copper levels in calves.

Guidance

- The need for copper supplementation of cattle should be regularly assessed in consultation with the farmer, veterinary and nutritional adviser.
- Copper inputs from all applicable sources (e.g. grass, forages, compounds, straights, mineral powders, mineral blocks, mineral buckets, boluses, injections and water supply) should be estimated as accurately as possible to ensure that, in total, there is no excess.
- Under normal conditions, and in the absence of significant antagonists, copper concentration in the total ration should typically be formulated to 20 mg/kg DM.
- If there is any doubt about the dietary trace element input, feeds (including pasture and forage) should be analysed.
- Feed analysis reports should not report estimated copper “availability” levels. The concentrations of copper antagonists should be measured and individually reported.
- If all interested parties agree that it is necessary to exceed 20 mg/kg DM of copper in the total ration (but not exceed the statutory limit), supplementation levels should be fully considered and the course of action agreed.
- Before prescribing copper supplementation which will bring the copper concentration in the total ration to more than 40 mg/kg DM, a full risk assessment should be carried out by a veterinarian.
- Supplementation action plans should be regularly reviewed to assess effectiveness and outcome.
- Records of changes to copper supplementation and protocols should be kept and included within herd health plans. All inputs of supplementary copper need to be considered.

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