

## No 160: Copper Supplementation for Ruminating Cattle

### Copper – an industry-led initiative to avoid over-supplementation in ruminating cattle

The agricultural industry has collaborated to produce an important “Guidance Note” on the need to avoid over-supplementation of copper. The final version of which has now been agreed.

Stakeholders from the veterinary, animal feed, advisory bodies and government have worked together in order to raise awareness of the need to comply with existing legislation through best practice.

#### Introduction:

Copper is an essential trace element required for growth, reproduction, bone development, connective tissue formation, pigmentation, formation of prostaglandins and many enzymes. There are numerous other roles in which copper participates, some of which still lack complete biological explanations.

The purpose of this industry-led initiative is not to explore the complex interactions and mechanisms of copper and its associated functions, neither is it seeking to change the levels of copper permitted to be used, but to generate an industry consensus on the responsible supply and use of copper on British farms.

#### Responsible use:

Although there are areas of uncertainty with regard to the exact mechanisms & interactions of copper with other elements, and even uncertainty regarding the true incidence of copper over-supplementation in cattle in the UK, there is one clear area of certainty and that is the maximum allowable concentration of copper in the diet of cattle without prescription.

EU Regulation 1334/2003 sets the maximum permitted level (MPL) of copper for ruminating cattle at 35 mg/kg at 88% dry matter; this equates to 40mg/kg total diet dry matter. 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.



#### Responsibility:

It is the responsibility of the farmer and those advising, that the legal maximum levels as described in Regulation EC No. 1334/2003 are respected.

Multiple supplementary copper inputs are common on British farms, such as copper-fortified feedstuffs, farm minerals, boluses, mineral licks, injections, drenches, buckets and mineral enriched water. Individually these inputs may not exceed the MPL, but in combination, the total may be in excess.

#### Copper Guidance Note:

In order to avoid the inadvertent oversupply of copper, a simple and practical Guidance Note is provided for farmers, vets, and nutritional advisers.

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### Factors to consider.

In regions with low molybdenum levels in soils and forages, copper deficiency in cattle is rare and as such supplementation levels are low. Table 1 is a snapshot of typical commercial levels used in some other countries where dietary molybdenum inputs are low.

**Table 1: Copper Levels**

		<b>Supplemental Level (mg/kg DMI)</b>	<b>Total (mg/kg DMI)</b>
Germany	3:1 Zinc:Cu	13	20
Ireland		15 - 25	20 - 30
Spain		10 - 12	15 - 20
NL		Early Lactation 15 Late Lactation 10	15 - 22
Canada		12	20
USA		12	20

The published Guidance Note suggests that where molybdenum and antagonists such as sulphur and iron are low, a "normal" formulation level in the complete diet should typically be 20 mg Cu/kg DM from all dietary sources.

However, where there is a higher level of molybdenum in the diet, an assessment of copper requirement should be carried out and a level of copper supplementation advised on the basis of that assessment.

There is an absence of robust equations for cattle on the relationships between molybdenum and copper. Estimates have previously relied on calculations derived from sheep experiments extrapolated to cattle. These equations have been used in forage analysis and in ration calculation, but may be misleading and can instil an undeserved sense of certainty in the mind of the farmer and adviser. The Guidance Note suggests

that the use of these sheep-based equations should be discontinued and numerical values of copper "availability" should be removed from forage analysis reports.

This highlights the need for urgent peer reviewed research to develop robust equations for cattle, which describe the mechanisms and interactions of copper, molybdenum and other antagonists. Research is also required to explore the type of copper sources best suited to minimise the detrimental effect of copper antagonists in the rumen. These inadequacies are further compounded by the lack of a reliable and agreed method of assessing animal copper status. We urge the industry to explore and develop suitable protocols to research these important issues.

Following discussions with industry stakeholders, the Advisory Committee on Animal Feedingstuffs (ACAF) and the Food Standards Agency (FSA), the following simple Guidance Note on page 3 has been agreed.

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### GUIDANCE

1. The need for copper supplementation of cattle should be regularly assessed in consultation with the farmer, veterinary and nutritional adviser.
2. 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.
3. 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.
4. If there is any doubt about the dietary trace element input, feeds (including pasture and forage) should be analysed.
5. Feed analysis reports should not report estimated copper "availability" levels. The concentrations of copper antagonists should be measured and individually reported.
6. 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.
7. 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.
8. Supplementation action plans should be regularly reviewed to assess effectiveness and outcome.
9. 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.

You are encouraged to discuss this guidance with your veterinary and nutritional advisers.

### Endorsed by:



We acknowledge the help and support of the above in the preparation of this work.

A simple XL spreadsheet to help calculate copper levels is on the A.H. VMD and FW TNI website. This is in unprotected format to enable users to download and modify with specific values.

Further information can be obtained from the Frank Wright Trow technical department on 01335 341102. Receive these technical publications directly via e-mail link. Contact Sarah Brandrick to register your interest on 01335 341128 or at [sarah.brandrick@frankwright.com](mailto:sarah.brandrick@frankwright.com). You can also access this and past CONTACT and URGENT NEWS publications by registering on our website: [www.frankwrighttrow.com](http://www.frankwrighttrow.com)