

FACT SHEET - CATTLE COSECURE

Introduction

Cosecure for cattle is a two bolus dose of Co/Se/Cu soluble glass. This product was invented at the University of Leeds and was initially developed jointly by the university and Pilkington Brothers. Cosecure is now manufactured by Telsol Ltd in Denbigh, North Wales. The new Cosecure boluses - launched in 1992, were first marketed by University of Leeds Innovations Ltd. This business was transferred to Telsol Ltd in June 1996 with the University of Leeds retaining an interest in the business.

All Cosecure products are based on a soluble glass formulation which, like most glasses is susceptible to rapid temperature changes. Therefore, when using Cosecure, the one precaution necessary is to ensure that its temperature at the time of dosing is not low as the bolus will go straight into the reticulum at a temperature of 38°C (100°F). We therefore advise that the bolus be at a temperature of about 15° to 20°C (60° to 70°F) prior to administration to the animal.

Manufacture

A copper/cobalt containing soluble glass is first melted, ground to a very fine consistency, sodium selenate mixed into this powder, the material granulated and then pressed into the bolus shape. This bolus is heated to fuse the particles together, with the sodium selenate being bound into spaces between the glass. On cooling the solid bolus is packaged and sealed in foil to prevent attack by moisture.

Mechanism of action

When administered to cattle (2 boluses per animal from 100kg body weight), the bolus dissolves from the surface exposed to the rumen environment. The rate of dissolution is normally about 3 mg of glass each day for every square centimetre of surface in contact with the rumen liquor. The surface area of each bolus is approximately 70 sq. cm and therefore, in theory, 210mg of glass should be dissolved per bolus per day giving a total release of 420mg of glass per animal per day. Therefore, as the bolus dissolves, the surface area should get smaller if the dissolution is completely even over the surface, and hence the total glass released per day should in theory decline with time from the initial value of 420mg per day. However, in practice the bolus does not retain a completely smooth surface, but becomes

uneven so that the surface area increases and hence the amount of glass released increases.

At the maximum release rate of approximately 700mg per day and an initial bolus weight of \pm 5g (x2) the life of the cattle bolus is approximately just over six months, i.e. the grazing season. However, in the case of dairy cows that are fed on high concentrate rations there is likely to be a more acidic rumen than in grazing animals and this increased acidity will accelerate the glass dissolution so that the life of the boluses may be reduced to the extent that treatment is required at 4 monthly intervals for maximum efficiency.

Table 1 lists the elements that are available to the animal on a daily basis and then gives a comparison of these against the animal's daily requirements.

Table 1 Trace elements available to cattle at two different release rates of the bolus (x2)

	420 mg/day	700mg/day
Cu mg/day	56.3	93.8
Co mg/day	2.1	3.5
Se mg/day	1.2	2.1
Other elements		
P mg/day	105.0	174.2
Na mg/day	74.8	124.4
Mg mg/day	3.4	4.7

The balance will be oxygen.

Cattle's requirement for the three trace elements are stated as:

Copper - a minimum of 10mgCu/kgDM but more in presence of Mo, Fe and S
 Cobalt - 0.2mgCo/kgDM
 Selenium -0.1mg/kgDM

If the daily dry matter intakes are approximately 3kgDM for a 120kg calf going up to 15kgDM for a 600kg adult cow, the daily minimum requirements of the element would be:

	120kg	300kg	600kg
Copper mg/day	30	75	150
Cobalt	0.6	1.5	3.0
Selenium	0.3	0.8	1.5

Therefore, there is an excess of the three trace elements at the lowest weight while the increasing dissolution of the bolus means that the requirements of the animals will be adequately supplemented by the COSECURE product as they put on body weight.

Efficacy

Cattle COSECURE has proved popular with many farmers and has been seen to have positive effects on the animals where trace element supplementation was necessary. Field trials have given positive results in such circumstances with improvements being seen in body weight gain, blood variables and fertility.

Field Trials

Location	Type of cattle	Start bodyweight	Extra weight gain in cattle given one COSECURE treatment
Aberdeen	Beef cattle	150/250kg	+10kg
Banff	Beef cattle	250/350kg	+19kg
Aberdeen	Suckler calves	150/250kg	+13kg
Northumberland	Beef cattle	200kg	+20kg
Devon	Beef cattle	250kg	+9kg
Devon	Beef cattle	300kg	+10kg

Although not all trials produced statistically significant weight gains (over undosed control cattle) the practical and economic significance of improved bodyweight gains is clear from the above.

The graphs on the following page are from a trial in the Yorkshire Dales conducted with thirty (15 control, 15 COSECURE-treated) dairy heifers aged 9 to 15 months at the start of the trial. Results are reported for the copper and selenium status.

These graphs show that treatment with COSECURE will improve the blood Cu and Se status of cattle. The copper and selenium supplementation from the COSECURE bolus is clearly taking place. The cobalt from the dissolving glass bolus will also be available to the animal.

In the case of fertility, accurate figures are hard to obtain and more often it is the farmer's own view that counts, as, for example, the situation of Mr John Close, a Cotswold dairy farmer with 40 cows:

“We struggled for years with irritable and restless cows who also had unacceptable levels of mastitis and infertility. Copper deficiency was the first problem diagnosed and treatment by injection improved herd health marginally. However, things really started looking up after a MAFF investigation revealed the additional problem of selenium deficiency. We were asked to participate in trials of COSECURE, a slow release rumen bolus that supplied copper,

selenium and cobalt. We noticed an improvement in the cows almost immediately. We are in an area particularly low in copper and selenium so we tend to dose our cows 3 times a year to be on the safe side. It's hard to quantify benefits, but having been involved in earlier trials this form of supplementation is cost effective. The cows look good and we no longer have infertility and general malaise associated with trace element deficiency. We have also had an improvement in milk quality and I am convinced it is related to the general well-being in the herd."

Results from our own University of Leeds dairy herd also support COSECURE'S effect on infertility. The University herd was found to be copper deficient with the only visible symptoms being "spectacles" in some 20 of 100 cows. Inspection of the fertility records showed, however, that on average 3.5 inseminations were required for each conception. Subsequent treatment of the whole herd with COSECURE has reduced this figure to 1.5 inseminations per conception. (Eighth International Conference on Production Diseases in Farm Animals, Berne, Switzerland. 1992.)

COSECURE will produce a healthy trace element status

- Ruminants obtain trace elements from feed, soil intake and drinking water.
- Factors which limit availability of trace elements lead to dietary deficiency, or insufficiency states.
- Insufficiencies of the key trace elements in cattle - cobalt, selenium and copper - are a drain on performance and profits.
- COSECURE given at turnout regularly supplies all three essential dietary trace elements during the grazing season.
- COSECURE is based on soluble glass technology. On dosing, the bolus lodges in the reticulum (rumen) where it dissolves gradually (hence the term slow release)
- The bolus quickly adapts to its rumen environment, to ensure effective slow release of cobalt, selenium and copper during the grazing season.

COSECURE's special features: What's needed, when it's needed.

- The COSECURE bolus dissolves completely.
- It leaves no harmful residues and nothing in the rumen.
- There are no milk or meat withdrawal periods.
- COSECURE is environmentally, as well as economically friendly.

- COSECURE can help put back essential trace elements modern farming techniques and other factors may take out.
- Only COSECURE supplements dietary cobalt, selenium and copper in a soluble glass bolus.
- COSECURE supplies trace elements essential for herd health and productivity.
- COSECURE dosing is easy, convenient and effective.
- COSECURE may be used in cattle of all types and ages over 100kg. One dose comprises 2 COSECURE boluses, ideally given at turnout.