

FACT SHEET - SHEEP COSECURE (Adult and Lamb)

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 glass particles together, with the sodium selenate being bound into the spaces between the glass. On cooling the solid bolus is packaged and sealed in foil to prevent attack by moisture.

The lamb bolus weighs approximately 16g while the adult bolus weighs 35g.

Mechanism of action

When administered, the bolus dissolves from the surface exposed to the rumen environment. The rate of dissolution is normally about 3 mg of total glass each day for every square centimetre of surface in contact with the rumen liquor. The surface area of the lamb bolus is approximately 16 sq. cms and therefore, in theory, 48mg of glass should be dissolved per day from the lamb bolus.

Table 1 below shows actual daily amounts of glass released from boluses recovered from lambs at slaughter.

Table 1 Weight of glass released per day from a lamb bolus - mg

No of days after administration									Mean
27	45	46	49	50	56	57	57		51
47	45	47	47	48	49	52	52	81	52
76	46	46	56	63	80				58
153	80	90							85

These results illustrate that the glass initially dissolves at close to the theoretical value of 48mg glass/day. However, 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.

In fact, 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. (Table 1 day 76 and especially day 153)

At the maximum release rate of 90mg/day and an initial bolus weight of 16.7 to 16.8g, the life of the lamb bolus is six months. This pattern of dissolution is ideal for the growing lamb as it means that as the lamb gains in weight, it is supplemented with an increasing level of the trace elements (Table 2).

Table 2 Trace elements available to the lamb at two different release rates of the bolus.

	50 mg/day	90 mg/day
Cu mg/day	6.7	12.1
Co mg/day	0.25	0.45
Se mg/day	0.08	0.14
Other elements		
P mg/day	12.5	22.4
Na mg/day	12.5	22.4
Mg mg/day	0.4	0.6

The balance will be oxygen.

The lamb's requirements for the three trace elements are stated as:

- Copper - a minimum of 5mgCu/KgDM but more in presence of Mo, Fe and S
- Cobalt - 0.2 mgCo/KgDM
- Selenium - 0.1 mg/KgDM

If the daily dry matter intakes are approximately 600g for a 20kg lamb, going up to 1000g for a 35kg lamb, the daily minimum requirements of the elements would be:

		<u>Lamb body weight</u>	
		20kg	35kg
Copper	mg/day	3.0	5.0
Cobalt	mg/day	0.18	0.2
Selenium	mg/day	0.06	0.1

A similar system will operate with the adult sheep bolus. The initial surface area of the bolus is 30 sq cms at a mass of 35g and this will give a total release of glass of 90mg/day (3mg/sq.cm/day). Therefore the initial release of material from the bolus will be as given in Table 3 at the 90mg/day. As with the lamb bolus there will be a roughening of the surface of the bolus such that the total glass released per day will normally increase to approximately 160mg after some 4 months in the sheep's reticulo-rumen. This is illustrated in Table 3.

Table 3 Trace elements available to the adult sheep at two different release rates of the bolus.

		90 mg/day	160mg/day
Cu	mg/day	12.1	21.5
Co	mg/day	0.45	0.8
Se	mg/day	0.14	0.25

The dietary intakes of dry matter quoted for pregnancy and lactation are a minimum of 1.2KgDM (55Kg 3ewe) up to a maximum of 2.3KgDM (75Kg ewe).

On this basis the requirement for the three trace elements can be stated as:

		1.2KgDM	2.3KgDM
Copper	mg/day	7.2	13.8
Cobalt	mg/day	0.24	0.46
Selenium	mg/day	0.12	0.23

These minimum requirements for both adult sheep and lambs are therefore met by the COSECURE supplementation and the adverse effects of molybdenum, iron and sulphur intakes on the copper status will also be adequately covered. It is only in very limited situations such as Teart pastures, where very high molybdenum levels are encountered (110 to 40 mg Mo/KgDM or greater), that double bolusing may be necessary to supply sufficient copper to counteract the molybdenum toxicity.

COSECURE dissolves away completely, lasting some five months in the lamb and eight months in the adult, thus supplying the animals with sufficient supplemental Co, Se and Cu over these periods to meet their requirements.

If you require further information or help with COSECURE please contact Dr Telfer on 0831-669652 or at Telsol Ltd, telephone 0113 226 0666.