COPPER RELEASE BY A BIMETALLIC SLUG IN SHEEP

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No satisfactory long-term method of copper repletion of ruminants is currently available. Electrolysis between dissimilar metals lodged in the rumen appears to offer a method of providing such a device. It has previously been shown that copper is released from a bimetallic copper/inconel slug within an artificial rumen environment (Bray 1994) at rates possibly high enough to provide sufficient copper for ruminants in copper deficient situations. A bimetallic slug consisting of copper/Inconel 601 was tested in weaner sheep in a depletion/repletion experiment.

Twenty weaner Merino and Merino cross lambs were fed a pelleted concentrate diet formulated to provide approximately 2.5 mg Cu/day (after Suttle 1974), until their blood copper levels had declined to 55 ug Cu/100 mL from an initial average level of 87 µg Cu/100 mL. A liver biopsy was taken, and the sheep paired on the liver copper levels. Ten sheep then had a bimetallic slug administered, while the other 10 sheep received a Cuprax pellet. The trial was continued for another 6 weeks, when a further biopsy was taken, and the liver copper levels determined. Cost and facility constraints resulted in the pre-repletion trends being used as a control.

A gradual fall in blood copper levels (Figure 1) during the depletion phase reflects the low copper intake. Both devices resulted in the elevation of blood copper following administration. The low liver copper levels attained at the end of the depletion phase reflected the fall of blood copper seen in Figure 1. Over the limited duration of the trial, the slug raised liver copper levels to 40 ug/g liver, and Cuprax raised the copper levels to 120 ug/g liver, both levels being within normal levels (40 - 400 ug Cu/g liver). The liver copper levels of the sheep treated with Cuprax, however, were significantly higher than those treated with the slug (PC 0.005).

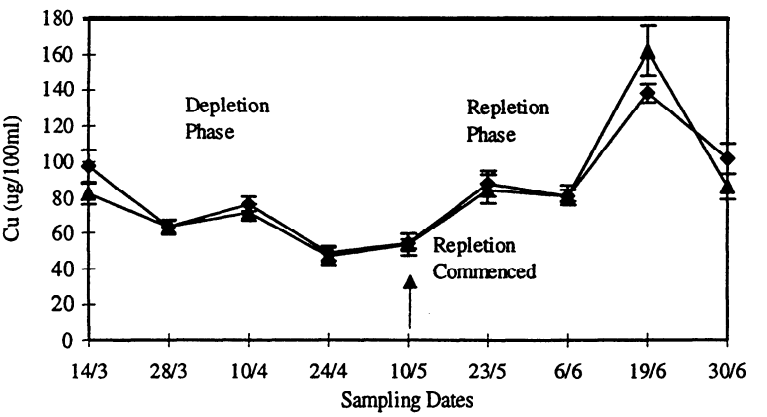

Figure 1. Mean of blood copper levels (µg/100 mL) in treatment groups. Repletion commenced 10 May 1995. The open triangles represent the slug, and the solid diamonds, cuprax

Although the cuprax appears to be superior to the slug in elevating liver copper levels, it should be realised that the repletion period was short, with no information about long term differences. A slow release of copper from the slug may confer some advantages over other repletion methods as it would last for the full lifespan of an animal. However, in view of the positive results obtained, it is felt that an extended repletion trial is warranted.

BRAY, A.C. (1994). *Proc. Aust. Soc. Anim. Prod.* **20:** *440.*
SUTTLE, N.F. (1974). *Br. J. Nutr. 32: 395.*