ABSTRACT

From field observations it is apparent that 15 mg of copper per kg of dry matter in French forages is the upper limit beyond which copper toxicity, mainly in lambs, is likely to occur. This relatively low value is attributed to low molybdenum concentrations in French feeds.

Copper toxicity in sheep is characterised by a haemolytic icterus crisis after the accumulation of large amounts of copper in the liver. The diagnosis of a copper toxicity is based mainly on liver copper concentrations (> 1 000 mg Cu/kg DM) and copper and molybdenum levels in the diet.

Prophylactic measures include the feeding of copper deficient forages alone, or in combination with sulphur and molybdenum supplementation. Supplementation of the diet with zinc may also be effective in the prevention and treatment of copper toxicity.
INTRODUCTION

The widespread use of copper supplements in the diets of pigs has created problems in the disposal of pig manure due to its high copper content. An attempt is made, with particular reference to copper and molybdenum concentrations of French forages, to evaluate the possible risk to sheep grazed on pastures sprayed with pig manure high in copper.

It is therefore important to monitor closely any appearances of clinical symptoms of a copper toxicity and to organise an appropriate means of prevention and treatment.

COPPER TOXICITY LIMITS IN SHEEP

Sheep differ from most other animal species in their low tolerance to dietary copper concentrations.

Copper deficiency, associated with swayback disease in sheep has been demonstrated in France. The preventive measures employed include the supplementation of the diet with copper, however, the determination of dietary limits of copper (minimum and maximum) is influenced by dietary molybdenum concentrations in view of the fact that molybdenum is a copper antagonist.

The accumulation of toxic levels of copper in the liver is achieved when there is an excess of copper in the diet. This phase may last for several weeks.

Molybdenum tends to limit the absorption of copper from the gut and to lower its accumulation in the liver and limit utilisation by cells. The quantity of sulphur in the diet is also an important factor in copper metabolism since sulphur has been found to be present in the di- and trithiomolybdates which are probably the compounds formed in the rumen and which are involved in a complex copper-sulphur-molybdenum interaction (Clarke and Laurie, 1980). These two compounds are absorbed from the intestinal tract of sheep and tend to lower