

Brief Communication

A COMPARISON OF TWO OXYTETRACYCLINE
FORMULATIONS IN CATTLE

Oxytetracycline (OTC) is in common use in cattle, mainly because of its wide antibacterial spectrum. The half-life ($t_{1/2}$) in serum is about 8 h. This means that after an intramuscular injection of the highest recommended dose, 10 mg/kg body weight, a therapeutic serum concentration ($> 0.5 \mu\text{g/ml}$) is maintained for about 24 h. This long dosage interval is of value from a practical point of view, especially in the treatment of beef cattle.

A depot formulation of OTC is now available. The product contains 200 mg OTC/ml and the solvent system is based on 2-pyrrolidone. After intramuscular injection of 20 mg/kg body weight therapeutic serum concentrations are said to be maintained for 3–5 days. According to *Cornwell* (1980) the mode of action depends on a controlled precipitation of the drug at the injection site.

In the present investigation the serum concentrations of OTC were studied in healthy calves of varying ages after intramuscular injection of a conventional OTC preparation (Terramycin 100, Pfizer, dose 10 mg/kg) and the described long-acting product (Terramycin L.A., Pfizer, dose 20 mg/kg). The calves were divided into 3 groups according to age and body weights. In Group A the weights were 50–100 kg, in Group B 130–240 kg, and in Group C 310–370 kg. Each group consisted of 6 animals. OTC in serum was measured by a fluorimetric technique.

The serum concentrations of OTC are shown in Fig. 1. The long-acting formulation gave higher peak values than the conventional one. The result obtained after injection of Terramycin 100 are similar to those reported earlier in calves after intramuscular injection of OTC at the dose 10 mg/kg (*Luthman & Jacobsen* 1978). The serum and tissue concentrations necessary for good clinical results depend on the sensitivity of the infecting agent. The concentration at the infection site should well exceed the MIC value. In the literature (e.g. *Brander & Pugh* 1971) the lowest therapeutic serum concentration is considered to be about $0.5 \mu\text{g/ml}$. If this limit is used in the present study, a therapeutic

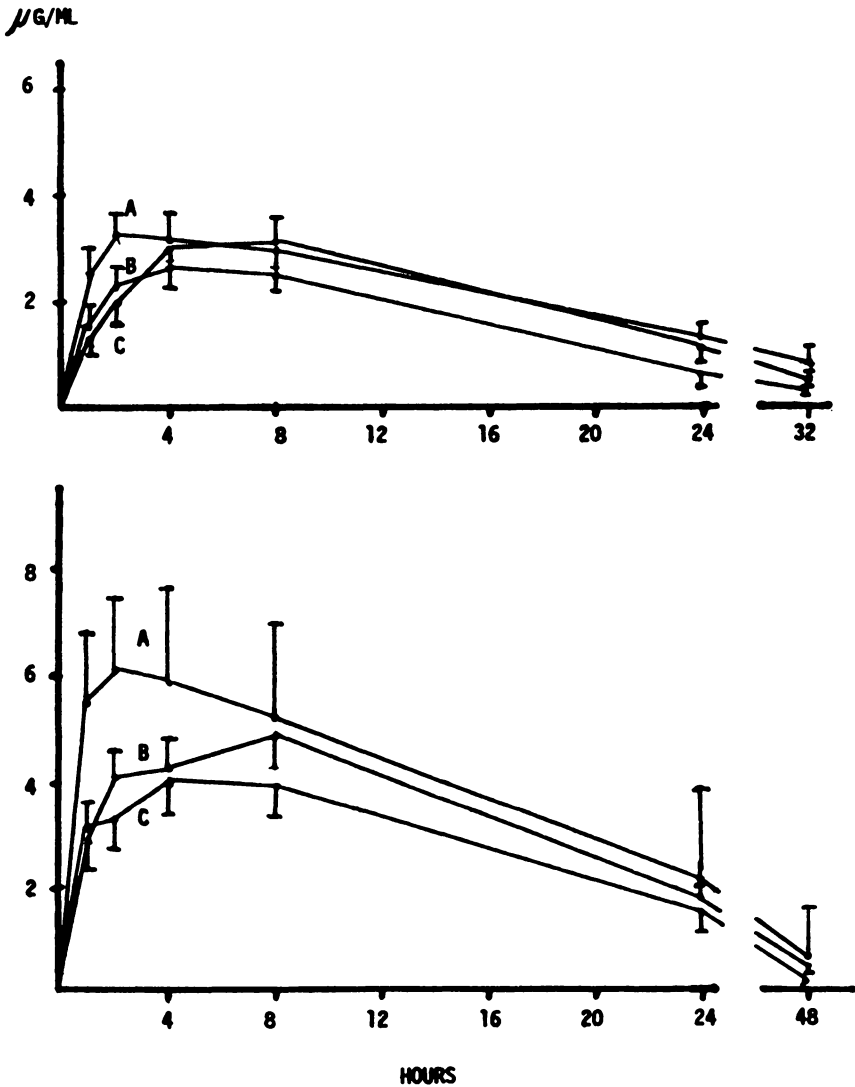


Figure 1. Serum concentrations of oxytetracycline in healthy cattle after intramuscular injection of a conventional preparation, dose 10 mg/kg (top), and a long-acting preparation, dose 20 mg/kg (bottom).
 A = animals weighing 50–100 kg
 B = — — 130–240 kg
 C = — — 310–370 kg

serum concentration was maintained for 24–32 h after injection of Terramycin 100, and for about 48 h after injection of Terramycin L.A.

In Sweden, bacteria isolated from animals with MIC-values

less than 4 µg/ml are considered as sensitive to tetracyclines. Obviously this means that many agents which after laboratory testing are classified as sensitive can not be eliminated after treatment with the recommended doses of OTC.

Magonigle et al. (1978) reported excellent clinical results after treatment of anaplasmosis in cattle with Terramycin L.A. One injection per day gave similar results as 2 daily injections of a conventional OTC formulation.

Breeze & Magonigle (1979) compared the therapeutic effects of Terramycin L.A. and a conventional OTC formulation in calves experimentally infected with *Pasteurella multocida*. A faster clinical response was observed after treatment with the conventional product.

The results obtained in the present study do not support the opinion that therapeutic levels of OTC are maintained for 3—5 days after injection of this long-acting formulation at the dose of 20 mg/kg body weight.

The positive results which have been reported, especially after treatment of bovine anaplasmosis, may be explained by the high dose, which leads to high OTC concentrations in serum and tissues.

Jan Luthman and Sten-Olof Jacobsson

The Department of Cattle and Sheep Diseases, Swedish University of Agricultural Sciences, Uppsala, Sweden.

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Reprints may be requested from: Jan Luthman, the Department of Cattle and Sheep Diseases, Swedish University of Agricultural Sciences, S-75007 Uppsala, Sweden.