

SECOND REPORT OF THE SCIENTIFIC COMMITTEE FOR ANIMAL NUTRITION ON  
THE USE OF MONENSIN SODIUM IN FEEDINGSTUFFS FOR TURKEYS

Opinion expressed 23 November 1983

TERMS OF REFERENCE (July 1980)

In reply to questions put by the Commission on the safety of use of monensin sodium in feedingstuffs for turkeys, the Committee, in its report of 11 March and 9 December 1981 (\*), considered that it could not express an opinion because of a lack of data on the metabolism of monensin in turkeys and on the nature and fate of its excretion products.

As the studies requested have been carried out and are now available, the Committee expressed the following opinion.

OPINION OF THE COMMITTEE

1. Tissue residues were determined in turkeys using monensin labelled with <sup>14</sup>C at seven specific sites. Birds were fed 110 mg labelled monensin/kg feed for five days and sacrificed 6 hours after treatment, thus allowing equilibration of tissue levels at steady state turnover. Residues ranged from about 1 mg/kg in the liver to less than 0.2 mg/kg in kidney, skin and fat, and less than 0.05 mg/kg in muscle (limit of detection 0.03 mg/kg). These results are comparable to those found in chicken using similar <sup>14</sup>C-labelled material. The distribution of the metabolites in the liver and excreta was also examined and found to mimic the chicken data.

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(\*) Reports of the Scientific Committee for Animal Nutrition, fourth series (1984), No EUR 8769, p. 25

Examination of the radioactive residues in the liver showed that about 1% of the total hepatic radioactivity was due to unchanged monensin, the remainder being distributed among the hepatic metabolites. Similarly, 7-8% of the total radioactivity in the excreta was represented by unchanged monensin, the rest being distributed among numerous faecal metabolites. The chromatographic pattern of the metabolites in faeces and liver appeared to be similar to that of the chicken, the main hepatic metabolite in both species being O-demethylated monensin. This compound has only 5% of the physiological activity of monensin.

Another residue study using turkeys fed for 17 weeks on 110 mg unlabelled monensin/kg feed gave results lower than those of the previous studies in liver, skin and kidney after 24 hours and no detectable residues after 48 hours. Analysis was carried out by microbiological assay (limit of detection 0.025 mg/kg tissue).

The use of monensin sodium up to the level of 110 ppm in the feeding-stuffs for turkeys would thus not lead to any measurable residues in the treated birds, provided a withdrawal period of at least three days is observed.

2. A comparison of the studies using both <sup>14</sup>C-labelled and unlabelled monensin in chickens and turkeys reveals quantitative and qualitative similarities with regard to metabolite pattern and tissue residue levels. It may therefore be assumed that the data concerning the biodegradation of monensin and monensin metabolites from chicken excreta in soil and water are also valid for the same substances derived from turkey excreta.

Environmental effects were studied using excreta from chicken or steers. Chicken fed 120 ppm monensin in their feed for 90 days excreted between 1.2 - 3.6 ppm (wet basis) in the faeces. When chicken excreta were stored, the monensin content dropped to 15% within 4 days. The monensin content of manure from steers declined to 20% within 9 weeks and of faeces to 65% within 10 weeks.

Monensin degrades in soil within 4 weeks. It leaches only from sandy soils, 30% being recovered in the leachate. Monensin slowly degrades in water on exposure to light with a half-life of over 30 days.

Litter from broilers containing about 3 ppm was not phytotoxic to 14 plant species when applied at the rate of 10 tons/ha. Cattle manure containing 2.8 ppm monensin was not toxic to earth worms (Eisenia foetida). Concentrations of monensin up to 300 ppm produced no apparent toxicity in rainbow trout (Salmo gairdneri) treated for 14 days. The acute LD<sub>50</sub> for bluegills (Lepomis macrochirus) was 33 ppm.

Monensin activity disappeared from activated sludge within 4 days and up to 25 mg/ml had no effect on the 5 day biochemical oxygen demand. Addition of pure monensin inhibits methane production in biogas production and also pure cultures of methanogenic bacteria. This activity is in agreement with the reduction in methane production observed in the rumen.

The use of monensin sodium in feedingstuffs for turkeys is thus not prejudicial to the environment.

3. On the basis of the available data, the Committee is of the opinion that the proposed conditions of use of monensin sodium in feedingstuffs for turkeys are acceptable, subject to a limitation of the maximum content to 110 mg/kg feedingstuff and provided a withdrawal period of at least 3 days is observed. However, the concentration resulting in maximum efficacy does not exceed 100 mg/kg.

#### REFERENCES

Dossiers supplied by Lilly Research Centre Ltd. (1983)