

## On-farm investigation of the occurrence of residues of the anticoccidial, nicarbazin, in poultry

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### Introduction

Poultry have a high susceptibility to the parasitic disease, coccidiosis, which damages the intestinal tract of the bird causing illness and sometimes death. The anticoccidial drug, nicarbazin, is routinely used to prevent coccidiosis in intensively-reared poultry. Nicarbazin is marketed, with the ionophore narasin, as the combined feed premix product *Maxiban*, and a 7 day withdrawal period applies. Nicarbazin residues occur frequently in poultry liver; results of an extensive study on broiler liver samples from commercial production on the island of Ireland found 13% of samples to be positive, i.e. >200 ppb (Danaher et al., 2004). This study examines the main causes for residue-positive poultry in commercial production.

### Materials and Methods

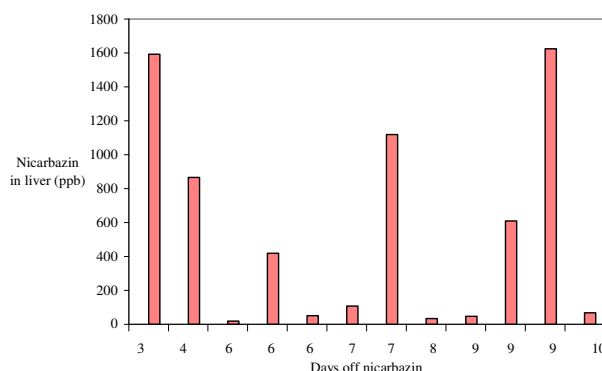
Liver samples (consisting of a composite of 5 livers/birds) were obtained from commercial poultry flocks (n = 32); sampling was undertaken on flocks ranging in age from 25 to 32 days old, with commercial slaughter being at 35 to 43 days old. At the same time as liver sampling, feed samples were taken from the feed-pans providing feed to the broilers. Liver samples, and selected feed samples, were analysed for nicarbazin by a high performance liquid chromatography (HPLC) method (Capurro, et al., 2003). Flocks (n = 12), representative of different feeding systems and for which the liver samples showed a range of nicarbazin levels, were selected for follow-up investigation. During these investigations different aspects of the poultry production system were considered, including the feeding system used, feed deliveries and feed management.

### Results and Discussion

All samples of liver taken in pre-slaughter sampling (n = 32) were found to be positive for nicarbazin, ranging from 30 to >4000 ppb. The concentrations of nicarbazin in the liver samples were as follows: ≤50 ppb - 22%, 50-100 ppb - 16%, 100-200 ppb - 16%, 200-500 ppb - 28%, 500-1000 ppb - 6%, >1000 ppb - 12%. For the flocks selected for further investigation, the birds were confirmed as being off feed medicated with nicarbazin for periods ranging between 3 and 10 days. No relationship was found between the levels of nicarbazin found in samples and the number of days since the flocks had been changed to a nicarbazin-free feed supply; samples from birds at 3, 7 and 9 days off medicated feed contained nicarbazin at levels above 1000 ppb (Figure 1).

Within the limitations of a small study of 12 flocks, the following general observations were made: (a) liver samples from flocks in houses with a single bin feeding system (n = 5) tended to contain higher nicarbazin levels than samples from flocks in houses with double and split bin systems (n = 7); (b) the nicarbazin levels

determined in liver samples from flocks that had been changed to a nicarbazin-free feed supply for 7 (or more) days were related to the levels of nicarbazin in feed taken from the feed-pans (Table 1). The latter observation suggests that continuing exposure of poultry to nicarbazin-containing feed is responsible for residue-positive liver.



**Figure 1.** Nicarbazin in liver (ppb) as a function of time off medicated feed (each column represents the result for a flock).

**Table 1.** Nicarbazin in liver and feed samples

Liver (ppb)	Feed (ppm)	Days off nicarbazin	Feed system
1624	10.7	9	Split bin
1120	5.0	7	Single bin
609	3.7	9	Double bin
106	0.8	7	Split bin
33	ND	8	Double bin

The investigations on farms identified the following issues as potential contributors to nicarbazin in poultry at slaughter: (a) poor understanding by some farmers of incompatibilities between medicated and non-medicated feeds; (b) poor management of feed bins on farms, particularly rotation of feeds; (c) deficient emptying and cleaning of equipment before feed changeover; for example, even where bins are emptied, emptying of hoppers and feed-pans may not occur.

### Conclusions

The results of the study indicate that high nicarbazin levels in poultry liver are due to continued exposure of birds to nicarbazin after changeover to a nicarbazin-free feed supply, caused by contaminated feeding systems and/or an ongoing supply of contaminated feed to birds.

### Acknowledgements

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### References

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