

Impact of the fungic and mycotoxicological quality of feed on the production of guinea fowl and palmipeds

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Economic losses without identified apparent cause are observed in the production of label guinea fowl and palmipeds. These losses are put down to fungal and/or mycotoxic contamination of food, without any relation of cause and effect having been determined as yet under the conditions of production in France. Although the acute or subacute toxicity of certain mycotoxins is well documented in poultry (Diaz et al, 1994; D' Mello et al, 1999; Mézes et al, 1998) no information is available about the consequences of continuous exposure on the production of label guinea fowls and fatty palmipeds. The daily doses to be administrated to the animals are not defined with sufficient precision in the French food standard regulations (except for the aflatoxins).

Corn and wheat constitute two cereals mainly used in this type of production. These two cereals could be contaminated with high levels of different types of mycotoxins: aflatoxins, ochratoxins, fumonisins, trichotecenes and zearalenone. All of these mycotoxins are likely to be hepatotoxic and / or immunotoxic and, therefore, to impair production, especially in the case of repeated low level exposure.

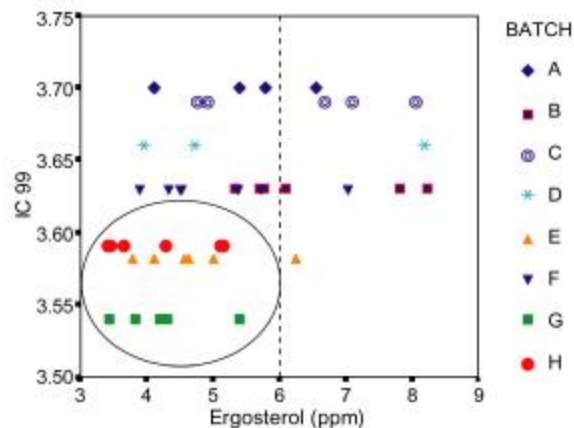
Through epidemiological studies, the objectives were to : a) Determine a possible relation between, on the one hand, fungic and mycotoxicological quality of feed consumed by poultry throughout the production cycle, and, on the other hand, the performances and health of the animals, b) To measure the fungic non-specific contamination of feed (ergosterol content) and specific contamination (content of various mycotoxins – deoxynivalenol (DON), fumonisins (FB), zearalenone (ZEA), toxin T2), c) Establish the impact of the mycotoxins through the measure of the biological and histological markers in animals, d) Research the threshold values of contamination making it possible to establish recommendations.

Thirteen batches of guinea fowls were followed from birth to slaughter (approximately 99 days). Clinical (change in behaviour, appearance of oral lesions) and zootechnical parameters of economic interest were recorded (FC, Mortality, ADG). Food samples were collected after each delivery when sharing out food in the hopper. The samples were preserved at -20°C until analysed. Analyses of ergosterol and mycotoxins (deoxynivalenol (DON), toxin T-2, fumonisins (FB), zearalenone (ZEA) and ochratoxins (OTA)) were done. 20 blood samples were taken from each set before slaughtering. Hepatic enzymes, proteinemia and cholesterolemia were determined. Results were expressed under the average form +/- standard deviation. Before slaughter, autopsies were meticulously carried out on 10 animals per batch from the 20 already chosen for blood tests and their livers, hearts and spleens were removed for histology.

From the 13 poultry farms initially included in this study, only 11 poultry farms were retained. The zootechnical parameter analysed were the 99-days consumption index (IC99) and global mortality of each poultry farm. Through the correlation between these 2 parameters, 2 groups of batches could be identified. The batch of poultry farms with IC99 and low global mortality (batches E, G and H) and the batch with an IC99 and quite a high mortality (batches A, C and D). Each group contains 3 poultry farms which amounts to 6 poultry farms analysed. 2 more batches with intermediate yield were retained (batches B and F).

For guinea fowl the ergosterol seems to be a determining criterion of the performance of the birds (Figure 1). Guinea fowl batches fed with feed containing more than 6 ppm of ergosterol have a higher feed conversion index. Even so, no batch presenting good performance has received high contaminated feed. For measured mycotoxins, no effect was observed on the performance and health of the birds at the doses found. For the biological marker, in guinea fowl only, we observed a higher level of cholesterolemia on the batches presenting a higher feed conversion index and having received feed more contaminated in ergosterol. These results suggest that if the high content in ergosterol observed in some batches could have caused a decreased of global performances (high standard IC), the phenomenon in question may originate in an alteration of the lipidic metabolism of animals. The direct consequence of this observation is that « the health » of animals having consumed feed with a high level of ergosterol (> 6 ppm) can be disrupted.

Figure 1 Correlation between ergosterol content of feed and IC99 depending on the batches of guinea fowl sampled
 Similar studies on ducks have shown that the quality of feed during the phase of pre-force-feeding has an



important effect on the weight of the liver at the end of the force feeding period.

Indeed, no batch presenting satisfactory yield had received contaminated feed with more than 10 ppm of ergosterol. The same observation has been made concerning deoxynivalenol; a threshold value of 1 ppm of DON has been observed.

The results of these studies allow us to conclude that the sensitivity to the fungal contamination and/or mycotoxic contamination of feed differs from one species to another.

This suggests that these inter-species differences will have to be taken into account in the threshold values of fungal and mycotoxic contamination in animal feed.

These results seem to demonstrate that for the first time ergosterol contents higher than a value to be fixed for each species can have an effect on final performances of animals and economical consequences on poultry farms. These kinds of studies are essential in assessment of risks. Such studies on animals, species by species, can not be avoided.

References

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