

USE OF DATA ANALYSIS TO RAISE ANTIBIOTIC AND COCCIDIOSTAT FREE BROILERS

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INTRODUCTION

An excessive use of antibiotics as a preventive treatment in animal production has contributed to the development of resistant bacteria (1). Consequently, antibiotic treatments may not be effective when they are really necessary. Given that the level of awareness about this issue is increasing among the scientific community and government authorities, the European Union, Brazil and the United States, among other countries, are enacting laws to limit the use of antibiotics.

As a result, the pressure on poultry producers is mounting to change their practices in order to reduce antibiotic resistance, being a key public health issue in this century. In order to apply these new changes in the poultry industry in a conscious and competitive manner, a programme has been created that identifies the critical and key factors for producing animals without antibiotics. The programme is supported by the use of biostatistics and the multivariate analysis to support the decision-making process (2,3).

MATERIAL AND METHODS

This study was conducted on an important Spanish integrated company, a producer of standard broilers, raised in a conventional manner with the therapeutic use of antibiotics and coccidiostats. A biostatistical study was conducted in which historical data of zootechnical parameters, slaughterhouse results and health and biosafety indicators were evaluated, establishing the key points to reduce the use of antibiotics and, therefore, determining which would be the farms with better conditions for the production of antibiotic and coccidiostat free broilers. Out of the farms evaluated, two that met the requirement of having two equal facilities each were chosen to conduct the trial.

The trial consisted of 5 production cycles in each farm, and the epidemiological unit was the facility. The chicks in the antibiotic-free (ABF) group were vaccinated on the first day of life against coccidiosis in all cycles, using a live attenuated vaccine for broilers (HIPRACOX®, LABORATORIOS HIPRA, Spain). The chickens on the conventional production (CVT) group received conventional feed with coccidiostats. The chickens on the ABF arm received exactly the same feed as the CVT group, but without coccidiostats.

Table 1. Trial design

FARM	FACILITY	ARM
A	1	ABF
A	2	CVT
B	1	ABF
B	2	CVT

Risk factors were detected from an analysis of two variables. Their importance was ranked using the multivariate random forests technique. The production results of the five cycles of the two farms were compared, depending on the group, using the Wilcoxon signed-rank test, with a 95% confidence interval. With the historical data of the company, two linear regression models were created, one with the feed conversion ratio as a response variable, and weight as an explanatory variable, and another one in which the average daily gain was the response variable. Based on these models, the feed conversion ratio and the average daily gain of the trial were corrected to 2.5 kg, so that fair comparisons could be made. Statistical analyses were performed on the software R Studio 1.1.453.

RESULTS AND DISCUSSION

A total of 253,878 chickens were studied in the ABF group and 315,078 in the CVT group. The mean age at the slaughterhouse was 40 days, and the weight between 2.3 and 2.8 kg.

The parameters evaluated were feed conversion ratio (FCR), average daily gain (ADG), European broiler index (EBI), mortality (% MT) and antibiotic consumption (ATB).

A mean increase in the feed conversion ratio could be observed in the ABF group (1.69) with respect to the CV Tone (1.65), without statistical significance ($p = 0.1728$).

The mean daily gain was practically the same, being 62.20 g for the ABF group and 62.60 g in the CV Tone, also without statistical significance ($p = 0.6965$).

The European broiler index (EBI) found was 358.02 on the ABF group and 369.81 on the CVT group ($p = 0.5148$).

With regard to the mortality, the ABF group had a 3.07% and the CVT group 2.56% ($p = 0.9765$).

Finally, the mean antibiotics consumption on the CVT group was 5.39 g/kg meat.

Table 1. Results by group

	ABF	CVT	P value
Feed Conversion Ratio	1.69	1.65	0.1728
ADG (g/day/bird)	62.20	62.60	0.6965
Mortality (%)	3.07	2.56	0.9765
EBI	358.02	369.81	0.5148
Antibiotic (g/kg meat)	0	5.39	N/A

N/A= not applicable

The farm classification study focused on the identification of those production factors that are key and critical for antibiotic or coccidiostat free production, and the specific weighting of each factor.

It was designed to improve the four basic pillars of poultry production: the quality of day-old chicks, nutrition, biosafety and handling, and health.

When a customised programme specifically designed to carry out the transition between conventionally raised broilers and antibiotic and coccidiostat free ones is followed, the production results are not significantly affected.



Moreover, the importance of vaccination against coccidiosis can be ascertained, given that the ABF group did not receive any treatment, while there was a need to use therapeutic antibiotics on the CVT group (with coccidiostats) to fight intestinal conditions.

CONCLUSION

1. The results show that, following a customised programme specifically designed to carry out the transition, it is possible to raise antibiotic and coccidiostat free chickens, achieving the same results as those raised conventionally.

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