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Antibiotic residues in broilers sold in Antananarivo, capital of Madagascar, in 2019

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RESUME

Breeding is a predominant and profitable activity in Madagascar. Currently, the poultry sector totals around 35 million head of poultry, according to the FAO. Intensive breeding is the most common form, but breeders resort to the use of feed and veterinary products to speed up the rate of production, which accentuates the presence of antibiotic residues in meats. They train several risks for public health. The objective of this study is to find and / or confirm contamination via the presence of antibiotic residues in broilers.

Surveys of breeders in the capital were carried out as well as samples from a slaughterhouse and butcher shops. Also, 163 samples were taken, including 58 and 105 respectively in the Itaosy slaughterhouse and in the butcher's shops. The samples were then analyzed at the National Veterinary Diagnostic Laboratory using the "Rapid test for the presumptive detection of antibiotic residues" method, certified by AFNOR. Surveys of breeders have shown that no training or monitoring of veterinarians is allocated to them, and good breeding practices are not respected. Analyzes carried out revealed the presence of antibiotic residues in 12 samples out of 163, that is a rate of 7.36%.

Keywords: antibiotic residues; broiler meat; poultry farming, slaughterhouse; Antananarivo

I. INTRODUCTION

Madagascar is an agricultural country where livestock occupies an important place in cultural, social and economic life and plays an important role in food security and the fight against poverty. Indeed, being one of the main agricultural activities in Madagascar, 71.70% of rural households practice animal husbandry and thus provide 25% of rural income. The poultry industry has become a very fashionable speculation, and is growing in importance. According to statistics published by the United Nations Food Fund (FAO), the poultry herd in Madagascar exceeds 35 million head, about 86% of these animals come from village poultry farming.

Two types of breeding can be distinguished: on the one hand, traditional poultry farming for the production of standard "Akohogasy" chicken and on the other hand, commercial or modern poultry farming which generally includes laying hens and broilers. .

Particularly, the production of short-cycle animals is one of the avenues used to achieve food self-sufficiency in meat and eggs due to low production costs and low prices of products resulting from this speculation. For Madagascar, the average annual production of broiler chickens per individual is 0.28 kg, or one fiftieth of the individual world production. The Malagasy consume 20 eggs per capita per year and 2.37 kg of broiler meat per year per capita

However, breeders resort to the use of feed and veterinary products to speed up the rate of production, which increases the presence of antibiotic residues in meats. They pose several risks to public health.

The objective of this study is to search for the presence of antibiotic residues in broilers sold on the Antananarivo market.

II. MATERIALS AND METHODS

Materials

Surveys of breeders in the capital were carried out as well as samples from a slaughterhouse and butcher shops. Also, 163 samples were taken, including 58 and 105 respectively in the Itaosy slaughterhouse and in the butcher's shops.

Methods

Poultry tissue samples were used for testing. Both types were submitted for regulatory analysis. These were received frozen and analyzed promptly or held frozen and analyzed within 3 days after receipt.

They wereshipped under refrigeration on the same day for analysis by the Charm *Bacillus stearothermophilus*disc assay (BsDA) as well as for analysis of total viable bacteria counts and coliform bacteria counts.

The day following the day of sampling, each refrigerated sample was analyzed for b-lactam residues by the antibiotic residue screening tests. These selected rapid screening tests represented a variety of analytical principles to assay b-lactam antibiotic residues on food. All screening tests were run simultaneously for each sample. The tests were conducted according to the recommendations of the manufacturers except that positive results were not repeated. Sample was collected from a control cow that had not been treated with an antibiotic within 30 days, and negative and positive control samples were assayed with each test for the 3 days of analyses. Penicillin-G sodium (1647 U/mg) was brought to a final concentration of 10 ppb for the positive control sample. Positive and negative control samples were prepared fresh daily for each test day. A visual detection of color change was done.

For this screening test, the selectivity rate (defined as the rate of truly negative samples that were found to be negative by the assay) and a 95% confidence interval were calculated. The selectivity rate was calculated as the number of truly negative assays divided by the total number of samples that were analyzed. The selectivity rate could be converted tothe false-positive rate by subtracting the selectivityrate from 1.0. Using logistic regression, factors associated with the rate of false-positive outcomes were evaluated for each test that had more than one false-positive outcome.

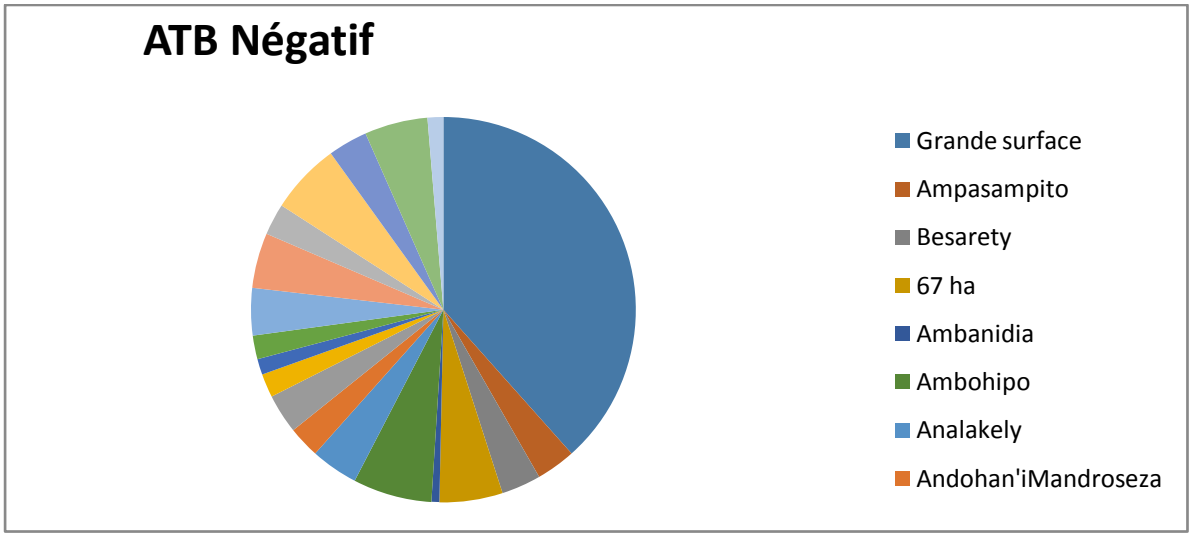
III. RESULTS

Surveys of breeders have shown that no training or monitoring of veterinarians is allocated to them, and good breeding practices are not respected.

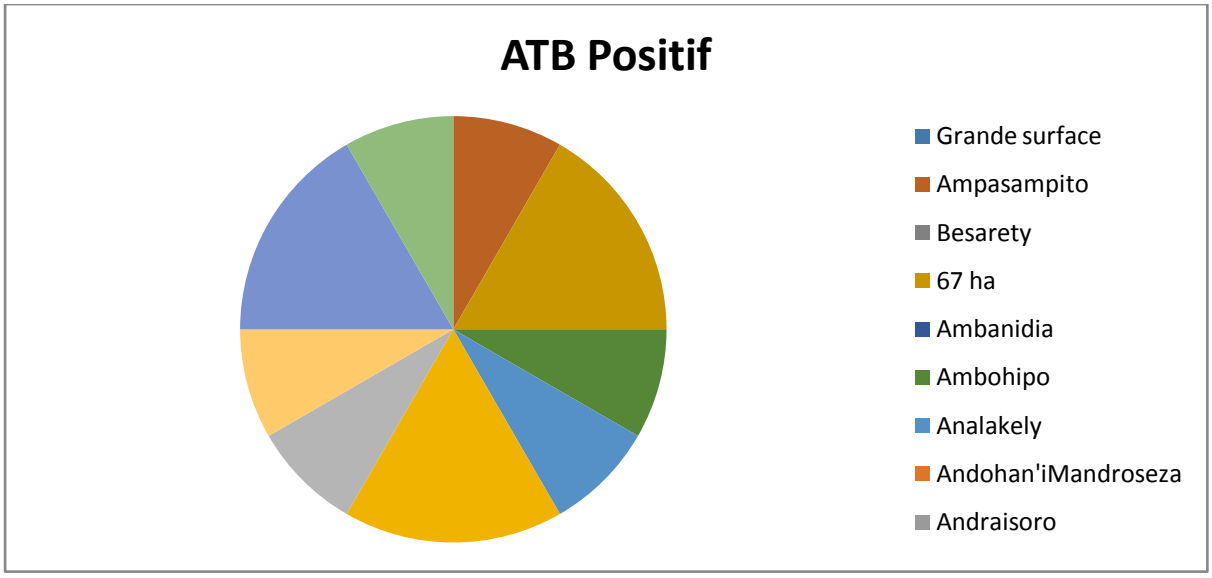
Table 1 and Figures 1 and 2 show the number of samples collected, which tested positive and which tested negative.

Table1 :Breakdown of sampling results

	Localisation marché	**ATB Négatif**	**ATB Positif**	**Effectifs**
Abattoir	Grande surface	58	0	58
Boucherie	Ampasampito	5	1	6
	Besarety	5	0	5
	67 ha	8	2	10
	Ambanidia	1	0	1
	Ambohipo	10	1	11
	Analakely	6	1	7
	Andohan'iMandroseza	4	0	4
	Andraisoro	5	0	5
	Andravoahangy	3	2	5
	Ankadidramamy	2	0	2
	Ankadifotsy	3	0	3
	Ankatso	6	0	6
	Anosizato	7	0	7
	Imeritsiatosika	4	1	5
	Isotry	9	1	10
	Itaosy	5	2	7
	Mahazo	8	1	9
	Tsimbazaza	2	0	2
TOTAL		**151**	**12**	**163**



Negative sample results



Positive sample results

Analyses carried out revealed the presence of antibiotic residues in 12 samples out of 163, ie a rate of 7.36%.

These results show that the presence of antibiotics in chickens was detected in butcher shops in municipal markets and not in products from supermarkets.

Table 2: Summary results of the laboratory analysis

Résultats	Nombre de prélèvements	Pourcentage (%)
POSITIF	12	7.36
NEGATIF	151	92.64

The use of antibiotic residue screening tests andthe implementation of good management practiceshave been shown to reduce the occurrence of antibiotic residues on poultry.

In the present study, the selectivity rates of thescreening assays were calculated using results fromthe poultry that had a high probability of no antibiotic drug residue. To calculate trueselectivity rates, the concentration of the antibiotic using quantitative analytical methodology isneeded.

Antibiotic screening assays that are based on theinhibition of microbial growth are sensitive methods,but, because they are nonspecific for the antibiotic,these assays are affected by naturally occurring antimicrobial components

The study confirms the misuses and non-compliance of the withdrawal period between the administration of antibiotic in animal and its slaughter. Therefore, control of antibiotic residues should be a future concern for both producers and processor in order to protect health's consumers.

The high level of contamination cases recorded in our poultry meatsamples canprobably be explained, by the massive use, uncontrolled and prolonged antibiotics in poultryfarms to treat and prevent against specific diseases, both in the therapeutic settingrecommended by the veterinarian or but in the case of self-medication, but also by thedisrespect of withdrawal periods between the administration of antibiotics in animal and earlyslaughter, motivated by a greater demand for this product in religious holidays, like Christmasin other countries. According to a survey

conductedin Ivory Coast on the use of antibiotics in the semi-industrial poultry farms, 73% of them donot seek veterinary and self-medicate (Ouattara and al, 2013).
The same observation was reported by Donkor et al. (2011) on the determination ofcontamination factors of animal products by antibiotics. Note that self-medication is bannedin developed countries. According to the French agency for Food Safety (AFSSA), it can bethe cause of the increase in multidrug-resistant pathogens. The same author points out thatwaiting time in order to ensure the health's consumer are not met in 51% of the farms visited.
Several factors may influence the use of antibiotics in poultry production. In France,according to a study on the use of antibiotics in pig production, poultry and rabbit, theinfluence of the breeding on the use of antibiotics probably finds its explanation from theintrinsic characteristics of the farm (buildings, geographical location), the practices of thebreeder. Indeed, the results of this survey show that biosecurity measures and the mastery ofmajor diseases are essential to the reduction of use (Chauvin and al, 2012).

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