

Screening Antibiotic Residues in Broiler Chicken Meat in Eastern Algeria

Asnoun Z^{1*}, Hani A² Reumichi H², Bouzid R¹ And Khellaf D²

¹ Lecturer, Chaldi Ben Djedid University El Tarf, Algeria

² Lecturer, National Veterinary School Algeria, Algeria

*Corresponding author's Email: bouzid_riad@yahoo.fr

Abstract

Currently, antibiotics are used to control the dominant infectious diseases in broilers. The uncontrolled and abusive use of this drug deposits residues in meat. This research highlights the importance and existence of veterinary antibiotic residues in chicken meat. In this study we have chosen on the gel diffusion method for residue detection. The results showed that more than 68 % of meat samples showed antibiotic residues with fluctuating levels depending on the antibiotics.

Keywords: antibiotic residues, Algeria, broiler meat, gel diffusion

1. Introduction

The use of antibiotics in human medicine and veterinary with a therapeutic aim constituted an effective weapon for a long time counters many pathogenic germs [1; 2]. However, the generalized, even abusive use of certain antibiotics, in curative, preventive treatment or as a food additive led to possibilities of development of the allergic reactions [3] and to increase the nosocomial risk and a possible significant relationship with certain cancers [4] and even with the development of populations of microbes resistances to antibiotics ([5; 6; 7; 8].

In spite of the various existing definitions of bacterial resistance to antibiotics in the bibliography and its dependence with the discipline of study considered, its approach and its expression are not completely the same ones, however, all their concepts do not differ in their consequences where the great danger is well the therapeutic in veterinary medicine and human failure, and can be a catastrophe of world width in a few years to come [9].

In order to preserve consumer food safety, a study was carried out on the possible presence of residues of antimicrobial substances in broiler chicken meat in the regions of Souk Ahras and Tebessa.

2. Materials and Methods

80 samples were randomly collected from butchers in the wilaya of Souk Ahras (Algeria), they were then analysed by a qualitative microbiological method allowing the detection of antibiotic residues.

Analysis Methods: The present method had for aim the detection of antibiotics residues, using sensitive micro-organisms. It consists in making diffuse an antibiotic in agar medium containing a bacterial stock sensitive to this antibiotic. For this reason, one deposits identical volumes representing several dilutions of the solution containing antibiotic on blotting paper discs.

These discs are put in contact of agar surface containing 106 to 107 cells indicating stocks or spores. During incubation (37°C /24h), the antibiotic diffuses in the gel by radiate way starting from its point of application. After 15 to 48 hours at the optimal temperature of growth of the micro-organism, one measures the diameters of inhibition which appear as a clear zone [10].

Data Analysis: Descriptive statistics are used to describe the basic features of the data in a study.

3. Results and discussion

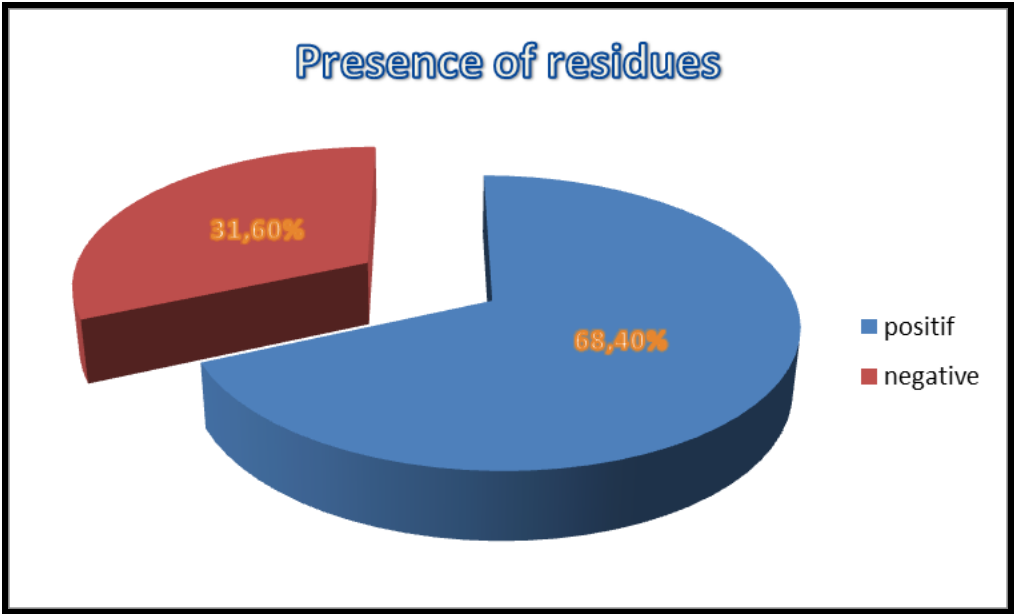


Figure 1: Analysis of antibacterial residues in samples

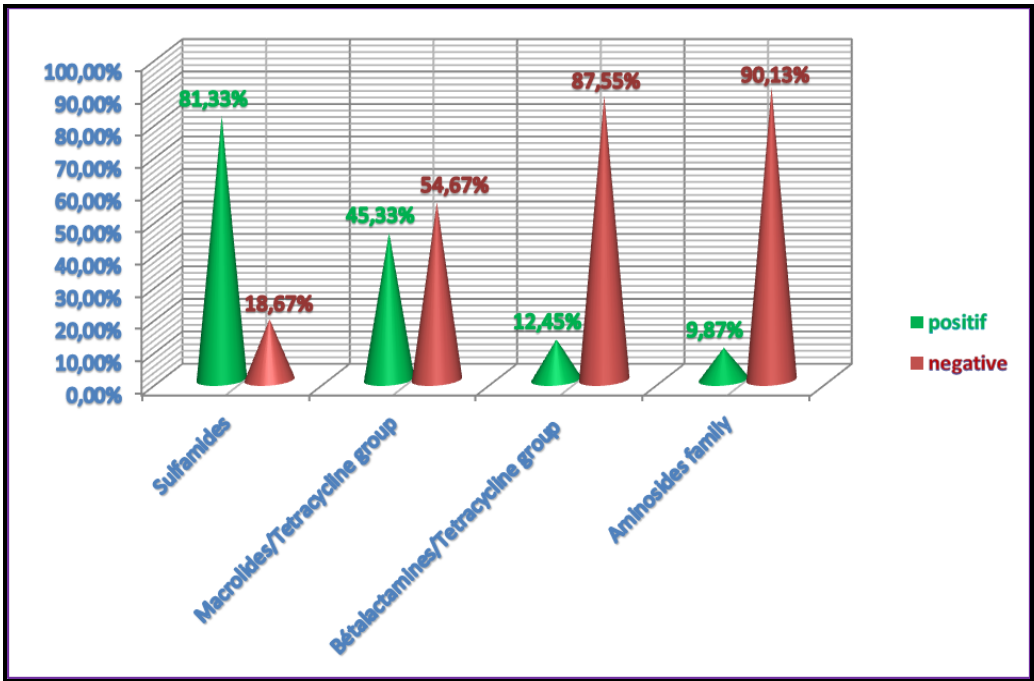


Figure 2: Analysis of antibacterial residues by antibiotics families

This analysis showed that 68.4% of the products analysed contained antibacterial residues (**figure 1**), 81,33% of the samples tested positive for the presence of antibiotic residues contained residues from the Sulfamides family, 45,33% from the Macrolides/Tetracycline group, 12,45% from the Betalactamines/Tetracycline group and 9.87% from the Aminoglycosides family (**figure 2**).

This may be explained by the abusive use of antimicrobial, false diagnosis, anarchic drug use or related to a treatment of the animals followed by an insufficient withdrawal period [11; 12; 13].

It should be also noted that the self-medication of the animals by the stockbreeders played a primordial role. This is consolidated by [14], who find that self-medication was practiced in 79 % of farms in Ivory Coast. Moreover addition of antibiotics as food additive (growth promoter) remained strongly suspected in spite of the prohibition of this practice [12; 15].

In the present study, the rate of negativity was low probably does not mean the absence of residues in the analyzed samples, because the latter can contain antibiotic molecules to a lower concentration than the CML. This situation could be explained by the use of antibiotics with low dose and for prolonged periods [16].

According to [1], the lack of sensitivity and specificity; as not to determine the exact nature of the molecule present, or the contents, and must thus often be followed tests of confirmations.

Our result was in agreement with those reported by [17]. However [18; 12] revealed respectively a percentage of 86.2 % and 60 % of positive samples.

The negative rate explain by the management of breeding by the official sector seems to be correct and respectful of the regulation and the use in a careful and rational way of the antibiotics [12].

4. Conclusion

The results obtained are quite alarming, especially when we know the harmful effects of the presence of these antibiotic residues, in particular the appearance of antibiotic resistance, on the health of the consumer, which is why, in order to counter this health problem, the rational use of antibiotics and the application, at the level of all the laboratories required, of methods allowing the detection of antibiotic residues in foodstuffs of animal origin are essential.

5. DECLARATIONS

Ethical clearance

The experiment was carried out according to the National Regulations on Animal Welfare and Institutional Animal Ethical Committee.

Source of funding

Self

Conflict of interest

There is no conflict of interest

6. References

1. Kantati, Y. T., 2011. Détection des résidents d'antibiotiques dans les viandes des bovins prélevées aux abattoirs de Dakar Ecole Inter-Etat des sciences et Médecin vétérinaires de Dakar (E. I. S. M. U), Mémoire de Master, Dakar, Université Dakar..
2. Berghiche A, Khenenou T and Labiad I (2019a). A Meta-Analysis on Antibiotic Residues in Meat of Broiler Chickens in Developing Countries. *J. World Poult. Res.*, 9 (2): 89-97.
3. Nisha, R., 2008. Antibiotic residus –a global health hazard. *Veterinary World* **1(12)** 375-7.
4. Dobson r, 2008. Antibiotics may be linked to risk of cancer. *BMJ.*, **337 (10)**: 1136 – 1381.
5. Endtz P., & J. RUIJS, 1991. Quinolone resistance in *Campylobacter* isolated from man and poultry following the introduction of fluoroquinolones in veterinary medicine. *J Antimicrob Chemother*, **27(2)**: 199-208.
6. Allena, J. & L. Viel, 1992. Changes in the bacterial flora of the upper and lower respiratory tracts and broncho alveolar lavage differential cell counts in feedlot calves treated for respiratory diseases. *Can J VetRes*, **56 (3)** : 177-83
7. Zhang, G. & J. Lin, 2003. Fluoroquinolone-resistant *campylobacter* in animal reservoirs: dynamics of developpment, resistance mechanismeandecological fitness. *Anim Health Res Rev* **4(2)**:6271.
8. Berghiche A (2019b). Special Attention is Needed for Reduce Antibiotic Residue Risk in the White Meat Produced in Algeria. *Journal of food quality and hazards control*, 6(2): 44-44. DOI: 10.18502/jfqhc.6.2.953.
9. Berghiche A, Khenenou T and Labiad I (2018a). Antibiotics Resistance in Broiler Chicken from the Farm to the Table in Eastern Algeria. *Journal of World Poultry Research*, 8 (4): 95-99. PII: S2322455X1800013-8.
10. Nakashima, A. K., McCarthy, M. A., Martone, W. J., & Anderson, R. L. (1987). Epidemic septic arthritis caused by *Serratia marcescens* and associated with a benzalkonium chloride antiseptic. *Journal of Clinical Microbiology*, 25(6), 1014-1018.
11. Randrianomenjanahary, N., 2006. Investigation sur la présence de résidus d'antibiotiques dans les denrées alimentaires d'origine aviaire commercialisées à Antananarivo(Madagascar) : cas du muscle et du foie . Thèse, Docteur Vétérinaire, Université de Dakar, Dakar, P82.
12. Mohamed Said, R., 2015. Etudes qualitatives et quantitatives des résidus d'antibiotiques dans la viande de volaille et les oeufs de la région de la Mitidja. Utilisation des probiotiques comme alternative (Doctoral dissertation, Université de Bejaia, Algérie, P159.
13. Berghiche, A., T. Khenenou, A. Kouzi & I. Labiad, 2018. An investigation on the predominant diseases, its diagnosis, and commonly used drugs in the poultry farms in the North Eastern regions of Algeria. *Veterinary World*, **11(7)**: 986-989.

14. DOSSO S., 2014. Analyse des pratiques avicoles et de l'usage des antibiotiques en aviculture moderne dans le département d'agnibilkrou (COTE D'IVOIRE). Thèse docteur vétérinaire, Université de Dakar. P152.
15. Berghiche A, Khenenou T and Labied I (2018). Importance of Antibiotic Residues in Food Stuffs of Avian Origin Marketed in Souk Ahras (Algerian Republic). International Journal of Veterinary Sciences and Animal Husbandry, 3(5): 5-10.
16. Klotins, K., 2005. *Utilisation des antibiotiques comme stimulateurs de croissance: controverse et solutions*. Ontario Ministère de l'agriculture, de l'alimentation et des affaires rurales.
17. Ben Mohand, C., 2008. Contribution à l'étude des résidus d'antimicrobiens dans le muscle de poulet de chair .Thèse de Magistère.Ecole Nationale Vétérinaire d'Alger, Algérie, P58.
18. Chaiba, A., F. R. Filali, & A. Chebaibi, 2017. Investigation of Antibiotic Residues in Poultry Products in Meknes–Morocco. *Journal of advances In Microbiology*, 2(1):1-8.