

ASSESSMENT OF THE ANTIBIOTHERAPY STATUS IN POULTRY FARMING AND IMPACTS OF UNRESTRAINED USE OF ANTIBIOTICS ON THE INTESTINAL FLORA OF BROILER CHICKENS IN EAST-ALGERIA

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Abstract. The abusive and frequent use of antimicrobial avicolas breeding led to the selection of the resistant germs with multiple harmful consequences on the public health. The objective of this work is to evaluate the consequences of the use of antibiotics in poultry farming on the pathogenic susceptibility of the bacteria; for this purpose, we initially carried on a field investigation with veterinary surgeons to identify the status of antibiotic therapy in poultry farming; thereafter, we isolated from the pathogenic bacteria starting from 50 samples of the fowl dropping, the antibiotic susceptibility was determined by antibiogram (agar diffusion). The results of the investigation revealed that the most common diseases in poultry farming are bacterial diseases, which explains the classification of antibiotics among the most commonly used drugs, tetracyclin in foreground followed by the macrolides (Erythromycin). In addition, three strains of pathogenic bacteria identified belong to the Escherichia, Salmonella and Shigilla types; among these three species of bacteria, all showed 100% resistance to tetracyclin and 92-98% resistance to erythromycin.

Keywords: antibiotics, broiler chicken, pathogenic bacteria, antibiotic resistance.

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1. Introduction

In Algeria, the poultry sector is one of the most spectacularly developed animal productions since the 1980s due to government intervention, which has made it possible to improve the food ration of protein content (Alloui, 2013).

In poultry farming, breeders use antibiotics for two purposes: as a growth promoter to increase production efficiency or as a therapeutic remedy to treat and prevent specific diseases (Hughes, 2004; McEwen, 2002).

The emergence of pathogenic bacteria resistant to antibiotics is one of the most serious threats for an effective treatment of a disease (Ventola, 2015). This emergency is noticed in the developed countries and in particular in the countries in the process of development where self-medication is frequent.

Antibiotic resistance in poultry farming develops immensely either for the animal or the farmer by expressing its danger through therapeutic failures that can even

threaten animal and human life, hence its risk to public health; this danger due to several phenomena, including the abusive and inappropriate use of antibiotics (Berghiche, 2017; Amábile-Cuevas, 2003).

This resistance can also natural which means the micro-organism has already an arsenal against these molecules or rather be acquired while adapting naturally to a medium consisted the presence of antibacterial (change, acquisition of genes of resistance...), the transmission of these micro-organisms resistant with respect to antibiotics, from the animal towards man or vice versa is not impossible thing (Wellington, 2013; Walsh, 2003; Chang, 2015).

The problem of possible pathogenicity to humans was first raised by WHO in 1977 (FAO, OIE and WHO, 2004), which recommended that resistance of enterobacteriaceae in medicine be monitored veterinary that is why we have focused our research on this subject.

2. Material and methods

2.1. Inquire into the ground

The investigation is based on a questionnaire intended for the veterinary doctors activating in the avicolous sector in the wilaya of Ahras Souk.

Fifty (50) questionnaires are distributed to the veterinary doctors, took place by visits made to the veterinary surgeons on the level of their cabinets.

The collected data were recorded and analyzed using the program (Microsoft Office Excel 2013), in order to carry out the description and the evaluation.

2.2. Study of resistance to antibiotics

In this study, we evaluated the resistance profile of selected bacteria to specific antibiotics namely *E coli*, *Salmonella spp* and *Shigella* isolated starting from 50 samples from broiler chicken droppings by the Bauer-Kirby disk diffusion method (Nakashima, 1987).

2.3. Data analysis

Descriptive statistics are used to describe our results and the graphic representation is realized using the Graph Pad Prism software.

3. Results and discussion

3.1. Inquire into the ground

The frequency of self-medication in the chicken farming:

The results of our investigation show that 57,1% of the questioned veterinary surgeons declare the self-medication in the avicolous is dominant. Our results are lower than those noted by Sinaly (2014) which found that 79% of the stockbreeders practise self-medication. Our results are also, higher than those of Khalen Wouembe (2013) which found that 33,64% of the stockbreeders of the area of the West of Cameroun practise self-medication.

If the poultrician is confronted with symptoms on his animal, he will use the same treatment as that previously established by the veterinary surgeon, who is called upon to intervene only in the event of therapeutic failure of the treatment prescribed by the farmer, this anarchic practice can select resistant bacteria (Boultif, 2015).

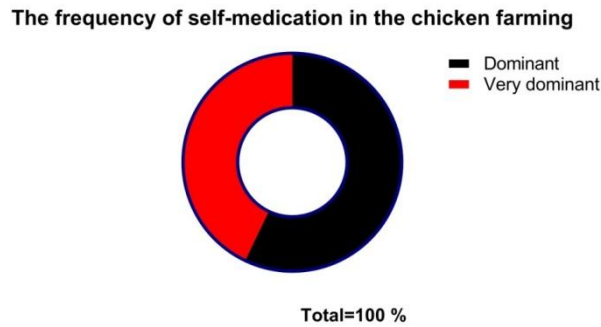


Figure 1. The frequency of self-medication in the chicken farming

Major prevalent diseases of the broiler chickens principal:

The report (Figure 02) represents that among different types of diseases occurred in the avian almost 100 % of these poultry are affected by bacterial diseases. Then the metabolic diseases with a rate come from 72 %, proportionally 28% and 24% for the parasitic and viral diseases. Our result is different to which found by Zerbo (2014) which the coccidiose is the parasitic disease frequency with a prevalence of 89%. Among the bacterial diseases Salmonellosis was found as the most prevalent one in this area (44%).

Another survey carried out in the area of Dakar by Benoit (2012) who found that the bacterial diseases are the most frequent; the Colibacillosis is present with prevalence of 46% and Salmonellose with 15%.

We found that coccidiose is the parasitic disease met it present with a prevalence of 43%, then the viral diseases, where the disease of gumboro has a prevalence of 41%, the disease of Marek with 10%, then Infectious Bronchitis 5% and the avianvariole 2%.

Principal diseases met in avicolous breeding

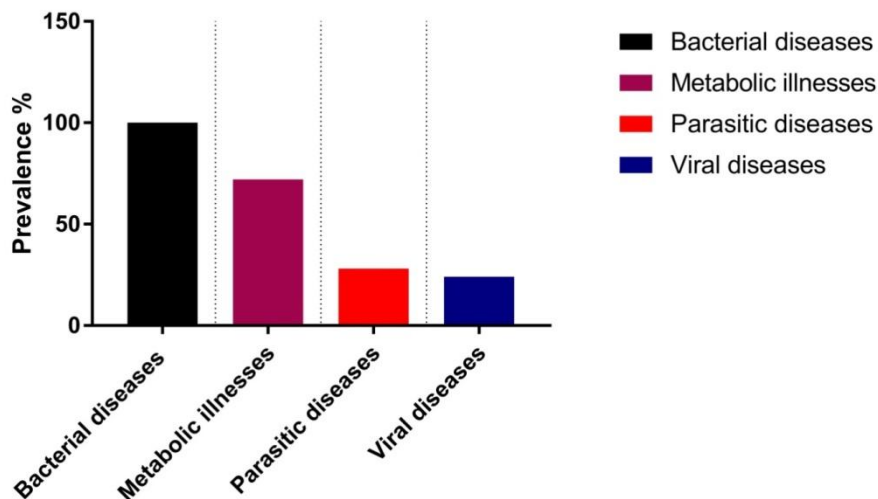


Figure 2. Principal diseases met in avicolous breeding

Medicaments most used in the avicolous field:

The drugs most used in the avicolous field are antibiotics with prevalence of 100% followed by the vitamins with at the rate of 84% followed by the antiparasitics 24% in third position.

Our results are similar to those obtained by Zerbo (2014) which found that the antibiotics are used like antistress, anticoccidians or anti-infectious. It comes out from that that the antibiotics are used in all the breedings surveyed with a rate of 95% (Berghiche, 2018).

OIE considers that the recourse to the antimicrobial agents is essential in veterinary medicine, because these products are essential with the treatment and the control of the infectious diseases of the animals (OIE, 2014).

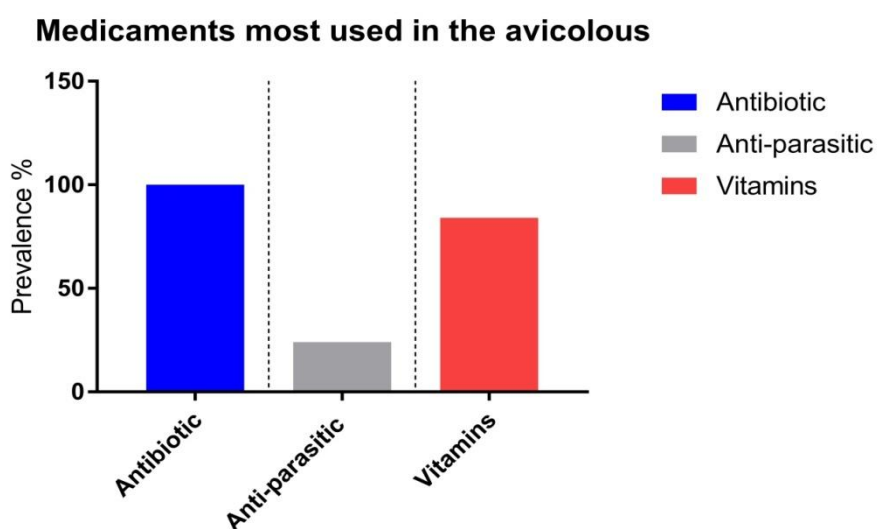


Figure 3. Medicaments most used in the avicolous

The mostly used antibiotics:

The family of the tetracyclins are used on the ground with 92%, followed by that of the macrolids with a rate of 72%. Our results are similar to those obtained by Ramdan (2015) and Mansouri (2007) that the family of the tetracyclins were the family most used in breeding aviaire with rates of 24, 3% and 63, 33% reported respectively.

Similar studies carried on family of antibiotics, in Canada by Tahiri and Diouri (2004), in Togo by Tona (2011), in Cameroun in the area of the West by Khaleh Wouembe (2013), and in the town of Ngaoundéré by Tatsadjieu Ngoune et al. (2009) also showed that tetracyclins were the family of antibiotic most used in the avicolous breedings.

The result found by Mansouri in 2007 is similar to ours, its findings show that the macrolides used in second position in breeding with a rate of 61.66%.

Resort to the laboratories of diagnosis:

A rate of 98% of veterinarians claims that they are not connected to diagnostic laboratories in order to validate their diagnoses. This, could be justified according to our

veterinary interlocutors by the distance of the regional laboratories whose routing of the samples would be too late to give the results, or other factors will be at the origin of the fast evolution of the processes of morbidity and mortality within the breedings, as well as the lack observed of the reagents chemical and other tools for analysis.

The mostly used antibiotics in poultry farming

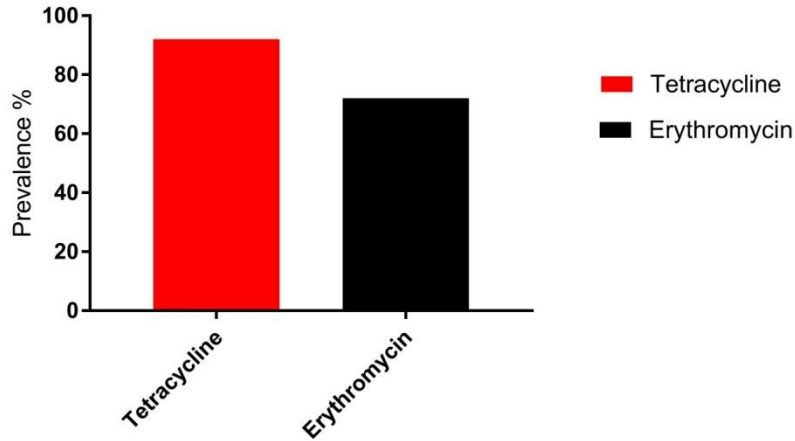


Figure 4. The mostly used antibiotics in poultry farming

Resort to the laboratories of diagnosis

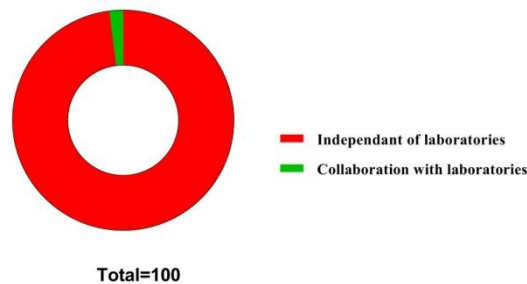


Figure 5. Resort to the laboratories of diagnosis

3.2. Results of resistance of the pathogenic bacteria to antibiotics:

Table 1. Resistancerates of the bacterial isolates against Tetracyclin and Erythromycin

Antibiotic stocks	<i>Escherichia</i>	<i>Salmonella</i>	<i>Shigilla</i>
Tetracyclin	100%	100%	100%
Erythromycin	92%	98%	0%

Comparison of the profiles of resistance *Salmonella Spp*, *Echirichia Coli* and *Shigilla*.

The statistical watch analysis that the resistance of the germs to antibiotics tested presents a significant convergence of the proportion of stock of *Salmonella spp* resistant to two antibiotics tested a little more significant is compared has that of *Escherichia Coli*. Whereas, we did not detect any isolate of *Shigilla* resistant to the erythromycin.

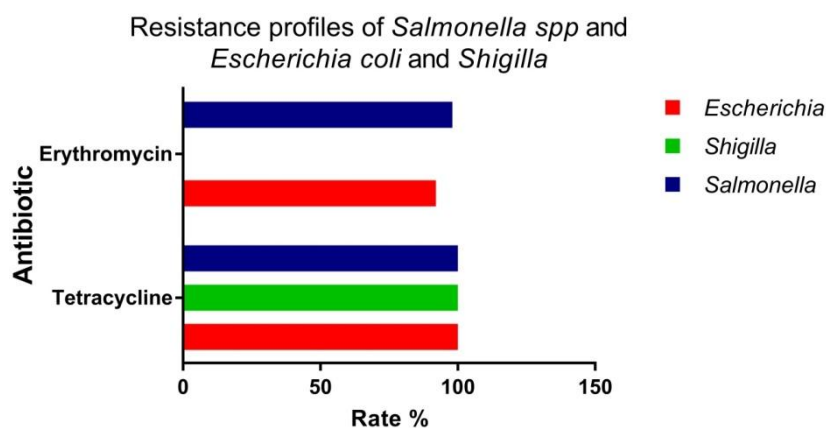


Figure 6. Resistance profiles of *Salmonella spp* and *Escherichia coli* and *Shigilla*

4. Discussion

Our study revealed that, *Escherichia Coli* isolates obtained from the broiler chicken's intestine showed highest resistance against tetracyclin (100%) and erythromycin (92%). One of the possible reasons of this frequency might arise from the excessive use of this antibiotic in cases of respiratory infections.

Our results show, in addition, which the stocks of the *Salmonellas* are little more resistant than those of *Escherichia coli* to two antibiotics tested.

In our study, on the whole, (98-100%) of the stocks of salmonellas appeared resistant against 81,11% of Fofana (2004).

In comparison with the results obtained by Fofana (2004), percentages of resistance of the stocks of *E.Coli* with the tetracyclin is very close to our result is 88, 89%.

Our results are also comparable with those of Emilie Gay et al. (2008) who stress that 80 to 85 % of isolates resistant to the tetracyclin.

Another study led to Cameron by Ngoune et al. (2009) showed similar resistances of our result vis-a-vis the tetracyclin (100%) and another inferior is that of erythromycine (45%).

However, Reece and Coloe in Australia (1985) have observe that the stocks of *E.Coli* and of insulated *Salmonellas*, at the time of the pathological cases in reproducer-flesh, table fowls and layer are frequently resist the tetracyclin (63,2-73,9%).

In a comparison to the following studies, results were obtained for *E coli* in India by Sarma et al. in 1981 and in the United States by Blackburn et al. in 1984 for the resistance of *salmonellas* isolated from chickens, turkeys, calves and pigs.

Generally, the stocks isolated from chickens are more frequently sensitive than those isolated from other animal species.

In 1982, a reduction in resistance to the tetracyclin was observed on comparable stocks of *E Coli* of origin avian, 17,9% of resistant to the tetracyclin (Smith & Lovell, 1984). This tendency to the reduction in the resistance of pathogenic bacteria, also observed in Japan, would be linked, according to these authors, with the regulation of the use of antibiotics as additives (Tagawa, 1981).

5. Conclusion

The results are alarming for all the stocks and the veterinary surgeons must be attracted attention towards the importance to fight against self-medication in the breedings avians, in particular the antibiotic if it is considered that its misuse for misguided reasons, the method of incorrect administration and the non-observance of the withdrawal periods of these molecules can constitute health risks human.

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