

## Analysis of antibiotic therapy practices in broiler farms: Case of Adiopodoumé and Agnébilékrrou farms (Ivory Coast)

Yao Konan Bertin<sup>1</sup>; Ouattara-SoroFatou Shcherazade<sup>1</sup>, Touré Alassane<sup>2</sup>,  
KouadioKouakou John<sup>1</sup>, Abizi Georges<sup>1</sup>, Tahnou Mariam<sup>1</sup>

<sup>1</sup>Laboratory of Biology and Health, UFR Biosciences, Felix HouphouëtBoigny University, Abidjan, Ivory Coast

<sup>2</sup>National Laboratory for Agricultural Development Support (LANADA) of Bingerville, Abidjan Ivory Coast.

Corresponding author Yao Konan Bertin

---

### Abstract

**Background:** This study aims to identify antibiotics and to know if their use takes into account the preservation of the health of broiler consumers.

**Materials and methods:** This survey was based on a descriptive cross-sectional study. It was carried out with one hundred and thirty-two (132) breeders, including thirty-two (32) in Adiopodoumé and one hundred (100) in Agnibilekrrou.

**Results:** It appears from this study that all the breeders questioned use different families of antibiotics. There are a total of seven (7) families of antibiotics, of which the tetracycline family (96.96%) is the most widely used. Then come sulphonamides (93.17%), macrolides (81.05%), polypeptides (68.18%) and betalactamines (60.60%). Finally, aminoglycosides (26.51%) and quinolones (28.63%) were the least used. In addition, oxytetracycline (83.33%) was the most widely used molecule. The use of these antibiotics is made intensively and abusively by unskilled breeders and poultry farmers. Taking the place of veterinarians, the vast majority (87.12%) of breeders practice self-medication without respecting the withdrawal periods for antibiotics.

**Conclusion:** At the end of this study, it appears that breeders use antibiotics excessively and intensively. This misuse of antibiotics is a proven risk that could compromise the health of consumers. Raising the awareness of breeders on good antibiotic therapy practices and the real dangers to which consumers are exposed is essential.

**Keywords:** Antibiotic therapy, Practice, Analysis, broilers

---

Date of Submission: 10-02-2022

Date of Acceptance: 24-02-2022

---

### I. Introduction

Poultry farming remains a driver of development in several countries (Ndiaye, 2002). In Côte d'Ivoire, poultry production contributes 88% to the production of poultry meat and covers the demand for table eggs 100% according to 2000 statistics (FAO, 2008). However, it is experiencing difficulties that are hampering its development. Several pathologies are observed, the most common being Gumboro disease, colibacillosis, salmonellosis, Newcastle disease and avian coccidiosis (M'bari, 2000). In order to fight against these pathologies, breeders use veterinary drugs, in particular antibiotics (Biagui, 2002).

According to the World Health Organization (WHO), more than 50% of the antibiotics produced in the world are intended for pets and farm animals. However, despite their necessity, these antibiotics are sometimes misused, so it is urgent to question the risks to consumers when they are used in food-producing animals (STOLZ, 2008). Indeed, the intensive and abusive use of antibiotics has two major consequences, namely antibiotic resistance and the presence of residues of active molecules (Levi, 2006). In the same way, the lack of mastery by breeders of antibiotic use practices could accentuate the risks incurred by consumers of broiler chickens.

For this reason, it seemed necessary to us to identify antibiotics and their practices of use on broiler chickens in the departments of Agnibilekrrou and Adiopodoumé (municipality of Songon).

### II. Materials And Methods

This study was based on a descriptive cross-sectional survey. It was carried out in Adiopodoumé and Agnibilekrrou. The survey was semi-open and declarative. A total of one hundred and thirty-two (132) breeders accepted and were interviewed individually. The questionnaire, divided into two parts, addressed: (1) the socio-professional characteristics of farmers and farm managers (age, sex, level of education and training in poultry

farming, attitude towards against cases of disease in chickens), (2) antibiotics (trade name, family, active ingredient, withdrawal period).

### III. Results

Socio-professional characteristics Nearly 81.06% of the breeders questioned are men. The majority (40.15%) of breeders are over 50 years old (Figure 1) and around 42.24% are illiterate (Figure 2) No breeder has a diploma in poultry farming, but 16% have already followed at least once poultry training sessions organized by animal health workers. As for farm managers (poultry); they mostly have a secondary education (29.54%). Among the latter, only 30 or 22.72% have received diploma training in poultry farming. The majority (77.28%) have learned breeding techniques on the job.

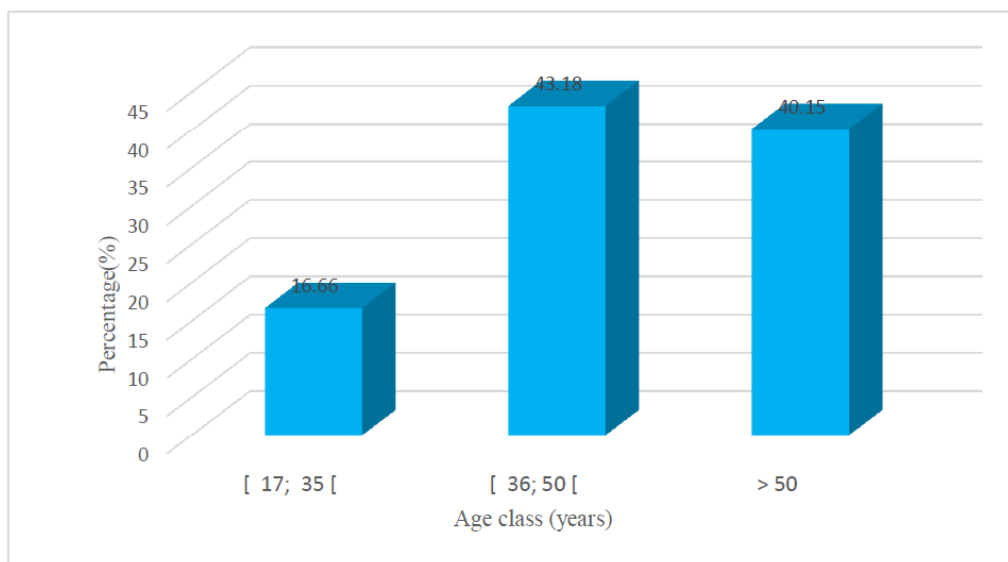


Figure (1) : Breeders age class

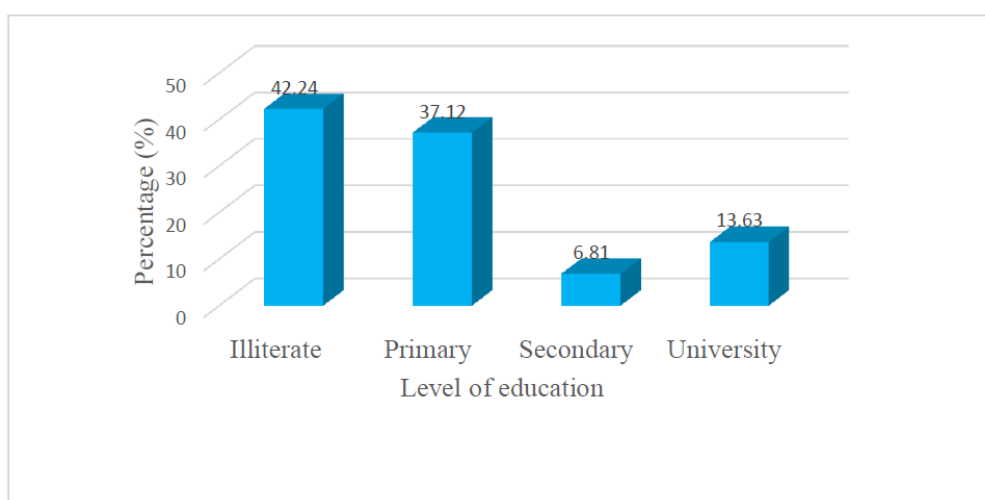


Figure (2) : Educational level of breeders

#### Antibiotics used in prevention

This study shows the curative treatment in broiler farms, antibiotics are used as anti-stress and anticoccidials. Indeed, all the breeders visited said they each had a prophylaxis program.

#### Anti-stress

Anti-stress are used against the appearance of disorders during periods of reduced resistance such as vaccination,

deworming or change of premises.

**Table I: Antibiotics used as anti-stress in broiler farming**

Registered names	Number of farmer users	Active substances	Waiting period (days)
Super – layer	10	Oxytetracycline	7
Aliseryl	5	Erythromycine	12
Vigal-2X	27	Erythromycine	3
Coliterravet	90	Colistine+oxytetracycline	2

### Anticoccidials

Anticoccidials are used in the prevention of coccidiosis

**Table II: Antibiotics used as anticoccidials in broiler breeding**

Registered names	Number of farmer users	Active substances	Waiting period (days)
Amprocox	7	Amprolium	14
Amprolium	15	Amprolium	14
Vetacox	96	Sulfadimidine	12
Anticox	14	Diaveridine+Sulfadimidine	12

### Use of antibiotics in curative treatment

#### Symptoms described by breeders

The symptoms commonly encountered in the farms visited are cases of respiratory infections (53.03%), diarrheal diseases (45.45%) followed by whitish waste (22.5 %) . Finally come inflammations of the feet and eyes (11.36%) and soiling of the anus (8.33%).

#### Attitude of breeders in the event of the appearance of symptoms

When asked what is the attitude of breeders in the event of avian pathology, breeders answered 87.12% that they systematically give antibiotic therapy without even knowing if the origin of the pathology is bacterial or not. Others (5.30%) on the other hand consulted websites and neighboring breeders. Only (7.57%) consulted veterinarians. In addition, 56.06% of breeders said they buy antibiotics both in pharmacies but also from street vendors.

#### Route of administration and dosage of antibiotics

The oral route, i.e. in drinking water and as a food additive, represents 99% of the routes of administration. However, they claim that the teaspoon remains their only instrument for dosing antibiotics and this without taking into account the weight of the chickens before antibiotic therapy.

#### Origin of water for watering and administration of antibiotics

Analysis of the watering system shows that the water used to water the chickens is the same as that used to administer the antibiotics. This water from wells (83.83%) or boreholes (16.66%) is never analysed. In addition, this drinking water is never treated in 45.45% of the farms surveyed.

#### Attitude in the event of failure of the first treatment

In the event of failure of the first treatment, some breeders (46.96%) stated that they increased the dose and prolonged the duration of the antibiotic therapy. Others (18.93%) breeders, on the other hand, change the antibiotic molecule. Finally, the rest of the breeders (34.11%) combine other molecules of antibiotics with the previous treatment.

#### Period of cessation of antibiotic therapy

Finally, when asked when farmers stopped treatment, it emerged that antibiotic therapy was interrupted in (53.03%) of the farms in case the animal was doing better. and in 31.18% when the clinical signs of the disease disappear. Only (7.5%) of breeders refer to the duration listed on the antibiotic leaflet.

#### Notion of residue and waiting period

This study showed that only 32% and 5% of the breeders surveyed have notions of waiting period and residue respectively. All the farmers surveyed do not respect the waiting period before making broiler chickens treated or under antibiotic treatment available to consumers. It is noted that only 5.30% of the breeders surveyed are aware that the misuse of antibiotics poses a risk to the health of consumers (Table III).

**Tableau(III) : Farmer’s attitudes towards antibiotic residues**

Settings	Yes (%)	No (%)
Notion of residue	32	68
Notion of waiting period	5	95
Respect of the waiting period	0	100
Risk associated with the use of antibiotics	5,30	94,7

### Antibiotics used

For the curative treatment several families of antibiotics are used. Thus the frequency of use of families of antibiotics by breeders is 96.96% for tetracyclines, sulphonamides (93.17%) macrolides (81.05%), about 60.60% for the betalactamines, and 68.81% for the polypeptics (FIG. 3). The other families of antibiotics are used less frequently. Within each family different molecules of antibiotics are used. Oxytetracycline (83.33%) from the tetracycline family is the most commonly used antibiotic molecule. The molecule used the least is norfloxacin (Table IV).

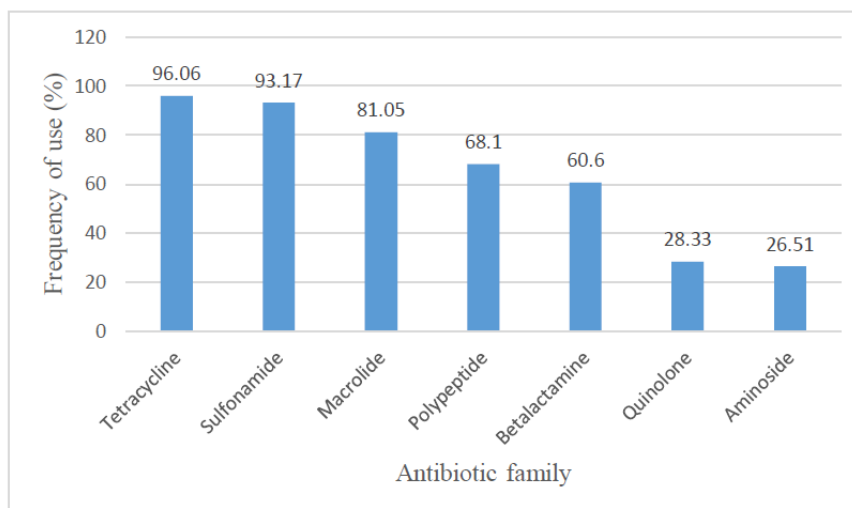


Figure (3) : Families of antibiotics used

**Table (IV) :Molécule of antibiotics used in curative treatment**

Familles	Antibiotics molecules	Number of farmer users	Fréquence (%)
Tétracycline	Oxytétracycline	110	83,33
	Doxycycline	18	13,63
Sulfamide	Sulfadiazine	93	70,45
	Sulfadiméthoxine	20	15,15
	Sulfaquinolxaline	10	7,57
Macrolide	Tylosin	32	24,24
	Erythromycin	75	56,81
Aminoside	Streptomycin	20	15,15
	Neomycin	15	11,36
Quinolone	Enrofloxacin	30	22,27
	Norfloxacin	8	6,06
Polypeptides	Colistin	90	68,18
Betalactamine	Amoxicillin	80	60,60

### IV. Discussions

The analysis of the socio-professional characteristics shows that nearly 42.24% of the breeders are illiterate and that no breeder has a diploma in poultry farming, with only 16% who have followed training sessions in poultry farming organized by the agents of animal health. As for farm managers (poultry); they mostly have a secondary education (29.54%). Among the latter, only 30 or 22.72% received diploma training in poultry farming. This result is similar to that found by Biagui (2002). Indeed, this author had observed that 19.67% of the breeders of Dakar in Senegal had followed training sessions in poultry farming. This low rate of training in poultry farming could be explained by the minority of poultry training schools available in Côte d'Ivoire. This study shows that all breeders use antibiotics as anti-stress in broiler farms. Our results are in agreement with Habyrimana (1998) who had shown that 90% of modern poultry farms in the Dakar region used antibiotics as anti-stress during vaccinations or other handling of birds. Indeed, the first days following the vaccination of the birds, the stress related to handling leads to a drop in their immune systems and makes them very susceptible to infections. It is therefore to prevent the risk of infection that breeders use anti-stress. The results also showed that antibiotics are also used as anticoccidials. The use of anticoccidials could be linked to the fact that most of the farms surveyed are floor farms, which would favor their infestation. (Nakie, 2012). Our results corroborate the work of Cardinal (2000) who revealed that coccidiosis is the first cause of death in modern farms in Senegal, hence the very important use of anticoccidials. The preferred use of sulfadimidine and amprolium by breeders is due to the antibacterial activity of these molecules in addition to their anticoccidial

activity (Nakié, 2012). The most commonly used route of administration is the oral route (99%). Our results agree with those of Chevance (2012) who also found that 99% of treatments in French poultry farms are oral. Drinking water is never analyzed on all the farms surveyed. This means that the water quality of routine per year must be carried out. Similar results were found by Khalen (2013) in poultry farms in western Cameroon. Indeed, water of poor bacteriological quality can cause digestive disorders (Fulbert & Alexandre, 2008) and therefore lead to the use of antibiotics in the fight against these digestive disorders. Our results reveal that only 7.5% of breeders consult veterinarians in case of pathology. This result is explained by the fact that some breeders find that the assistance of animal health workers is futile. Indeed, for these breeders, animal health workers do not always respect biosecurity measures and could be vectors of pathogens from one farm to another because the latter can circulate in several farms at the same time in the same day with the same clothes without taking precautions. The results are much lower than those of Paré (2012) who found that 77.7% of modern poultry farms in the peri-urban area of Dakar in Senegal have an animal health officer responsible for health monitoring. revealed that more than 87.12% of farmers practice self-medication. This result is similar to that obtained by Tatsadjieu in Cameroon (83.3%). Self-medication is, according to the French Agency for Food Safety and Health (AFSSA), at the origin of the appearance of multi-resistant pathogenic germs (AFSSA, 2006). This self-medication is due to the fact that breeders believe that they master breeding techniques and also know the drugs they need in case of illness by just observing the symptoms. Moreover, the fear of seeing the animals die and the presence of parallel markets for the sale of veterinary drugs could encourage most breeders to indulge in this practice. This same practice was observed by Tona (2011) in Togo where table egg producers practice self-medication. Our results are also superior to those of Khalen (2013) who found that 33.64% of farmers in the West region of Cameroon practice self-medication. The majority of farms (56.06%) get their supplies from the official circuit as well as from the unofficial veterinary medicine distribution circuit. The proximity of the town of Agnibilekrou to the border between Côte d'Ivoire and Ghana, the lack of controls would explain the existence of a parallel market for the sale of veterinary drugs. All antibiotic therapy requires an estimate of the animal's weight because the doses are expressed in mg/Kg of live weight (Messai, 2006). poultry. While estimating the weight allows the dose to be administered recommended and avoids overdosing or underdosing which could subsequently be responsible for the selection of a resistant strain in the bacterial species against which the antibiotic therapy was to combat (Messai, 2006). Certain breeder practices such as the systematic treatment of sick broilers without knowing the bacterial origin, increasing the dose, extending the duration of antibiotic therapy. The change of molecule of antibiotics and the association of several molecules of antibiotics in case of failure of the first treatment. In addition to these latter practices, the use of antibiotics in prophylaxis programs as an anti-stress and anticoccidial and as a food additive constitutes an intensive and abusive use of antibiotics. All these poor practices of antibiotic therapy could in the long run lead to the appearance of resistant germs (Wegener et al., 1999). Stopping antibiotic therapy by farmers is also based on the disappearance of disease symptoms or when the broiler is better. These behaviors of breeders should be avoided because stopping treatment must be based on the indications given in the leaflet or on the recommendation of veterinarians. All the breeders interviewed (100%) do not take into account the waiting period for antibiotics before making chickens treated or under antibiotic treatment available to consumers. Where as when the withdrawal period is not respected, antibiotics can on the one hand leave residues in foods of animal origin that are dangerous for the consumer and can lead to hypersensitivity accidents or poisoning. On the other hand, it can also lead to the selection of resistant bacteria during subsequent treatments (Bada-Alamedji et al., 2008). This non-compliance with the waiting period by breeders could be explained by the fact that (94.7%) of breeders are unaware of the risks linked to the residues that these foodstuffs could contain but above all to deal with the purchase of feed and any infections that may arise. Non-compliance with waiting times by breeders has been observed in other countries such as Togo (Tona, 2011), Senegal (Pare, 2012), Cameroon (khalen, 2013) and even in Côte d'Ivoire (Bitti, 2013). Non-compliance with withdrawal periods could therefore be both the cause of the presence of residues in foodstuffs of animal origin which can be transmitted to humans through the food chain and cause food allergies, as well as the selection of resistant pathogenic bacteria (Chaslus-Dancla, 2003). Several studies have been carried out on this subject. First, the study carried out by Hampoh (2008) on a poultry farm in Bingerville (Cote d'Ivoire) showed that 80% of samples from chicken meat contained antibiotic residues. Another study on the residues of antibacterials in the liver and gizzard of broiler chickens in the regions of Dakar and Thiès in Senegal, carried out by Diop (2003) revealed the presence beyond the Maximum Residue Limit (MRL), residues of tetracyclines, sulfonamides, macrolides and or beta-lactams, nitrofurans and chloramphenicol. It should be noted that nitrofurans and chloramphenicol are among the substances prohibited in animals intended for human consumption (FAO/WHO/OIE, 2007). The survey also revealed the proportions in which antibiotics are used on farms. Indeed, breeders use large quantities of tetracyclines, sulphonamides, macrolides and small quantities of quinolones and aminoglycosides. Several surveys carried out around the world have also shown that all these families of antibiotics are used in poultry farming (Mogenet et al, 1998, Messai, 2006; Tatsadjieu et al., 2009). The use of tetracyclines, sulfonamides and polypeptides, in particular

colistin, in large quantities could be explained by the fact that it is used in the event of digestive and also respiratory infections. Moreover, colistin is not only used in the fight against coccidiosis and colibacillosis but also in the treatment of mycoplasma infections (Messai, 2006). The use of tetracyclines could be due to their undisputed efficacy, moreover they are broad-spectrum bacteriostatic antibiotics, and are also active against Gram+ and Gram- bacteria (Armengaud et al., 1994). They are also the components of several veterinary products. The high rate of use of the sulfonamide family is due to the fact that they are also broad-spectrum antibiotics against bacteria, protozoa and fungi. Quinolones are used by farmers at low rates. The low use is due to the fact that quinolones have been authorized in veterinary medicine in the recent past and therefore they would still have very good activity against Gram-negative bacilli (Kiswendsida., 2011). The disorderly use of antibiotics in farms is the cause of selection pressure that allows the development of resistant bacteria. Also, according to several authors, a close relationship exists between the quantity of antibiotic used and the appearance of resistance in the microflora circulating in the farm environment (Tatsadjieu et al., 2009).

## V. Conclusion

It emerges from this study that seven (7) families of antibiotics, namely tetracyclines, sulfonamides, betalactamines, polypeptides, macrolides and quinolones, are used during prophylaxis as well as in curative treatments for certain avian infections. In addition, tetracyclines are the most widely used families of antibiotics. However, the use of these antibiotics is made intensively and abusively by breeders. However, this study also showed that breeders and low-skilled poultry farmers who in their vast majority practice self-medication have never respected the deadlines. waiting period for antibiotics before broilers are made available to consumers. These practices constitute proven risks that could compromise the health of broiler consumers. Training and awareness sessions for breeders on good practices and the real dangers of using antibiotics are recommended.

## Références

- [1]. AFSSA (Agence Française de Sécurité et de Salubrité des Aliments), 2006. Usage vétérinaire des antibiotiques, résistance bactérienne et conséquences pour la santé humaine. Rapport, France. 214p.
- [2]. ARMENGAUD M., ASTRUC J., AUBERTIN J., AUVERGNAT JC., BEAUCAIRE G., BECQ- GIRAUDON B. et BERTRAND J. L., 1994. Antibiotiques. In : Les maladies infectieuses. – Paris : APPIT Edition 2M2.-671p.
- [3]. BADA-ALAMBEDI R., AKAKPO A. J., TEKO-AGBO A., CHATAIGNER B., STEVENS A. et GARIN B., 2008. Contrôle des résidus : exemple des antibiotiques dans les aliments au Sénégal. Conférence de l'OIE sur les médicaments vétérinaires en Afrique, Dakar, 25-27 mars.-11p 6
- [4]. Biagui, 2002, Utilisation des médicaments vétérinaires dans la région de Dakar à travers la recherche de résidus de substance à action antimicrobienne (antibiotiques). Thèse de médecine vétérinaire, Université Cheikh Anta Diop de Dakar, 108p.
- [5]. BITTY Z. B. A., 2013. Contribution à l'amélioration de la gestion sanitaire et des pratiques médicales en élevage avicole moderne dans la zone péri-urbaine d'Abidjan (Côte d'Ivoire). Thèse. Méd. Vét : Dakar ; 18
- [6]. Cardinal E., 2000. Le réseau sénégalais d'épidémiologie vétérinaire (RESESAV) : Présentation et premiers résultats. Epidémiol. et santé anim., 37 : 105-116
- [7]. Chalus-Dancla E., 2003. Les antibiotiques en élevage : état des lieux et problèmes posés.
- [8]. CHEVANCE A. et MOULIN G., 2012. Suivi des ventes de médicaments vétérinaires contenant des antibiotiques en France en 2011. Rapport.-Paris : ANMV.- 68p.
- [9]. Diop M.M., 2003. Étude des résidus de médicaments vétérinaires dans les produits aviaires de la zone des Niayes, Thèse de médecine vétérinaire, Université Cheikh Anta Diop Dakar; 117p. FAO
- [10]. FAO, 2008. Etude du secteur avicole en Côte d'Ivoire, structure, importance et perspectives. Cas de l'aviculture semi-industrielle et l'aviculture familiale. Revue du secteur avicole: Côte d'Ivoire. 77p.
- [11]. FAO/OMS/OIE, 2007. Réunion mixte d'expert FAO/OMS/OIE sur les agents antimicrobiens d'importance critique. Rapport de la réunion d'expert FAO/OMS/OIE, Rome 26-30 Novembre 2007. 87p.
- [12]. HABYARIMANA W., 1998. Contribution à l'étude des contraintes au développement de l'aviculture moderne dans la région de Dakar : aspects techniques et institutionnels Thèse : Méd. Vét : Dakar ; 18
- [13]. KHALEN WOUEMBE D. F., 2013. Etude de l'usage des antibiotiques dans les élevages avicoles modernes de la région de l'ouest du Cameroun. Thèse. Méd. Vét : Dakar ; 8.
- [14]. LEVI Y., 2006. Inquiétude sur la présence d'antibiotiques et de bactéries antibiotiques résistantes dans les eaux. Environnement, Risques et Santé, 5(4) : 261-265. 62
- [15]. M'BARI K. B., 2000. Contribution à l'identification des contraintes au développement de l'aviculture en Côte d'Ivoire. Thèse. Méd. Vét : Dakar ; 4
- [16]. MESSAI A., 2006. Analyse critique des pratiques de l'antibiothérapie en élevages avicoles. Thèse : Méd. Vét : Constantine (Université de Saad Dahleb Blida, faculté des sciences agronomiques et biologiques).
- [17]. Nakié .G., 2012. Contribution à l'étude de l'utilisation des médicaments vétérinaires dans les élevages avicoles modernes de la zone périurbaine de Dakar (Sénégal), Thèse : Médecine vétérinaire, 7
- [18]. NDIAYE M-L., 2002. Contribution à l'étude de la contamination microbiologique de la viande de volailles. Mémoire de DEUA, Faculté des sciences et techniques institut de technologie nucléaire appliquée I.T.N.A. Université Cheikh Anta Diop de Dakar.
- [19]. PARE G., 2012. Contribution à l'étude de l'utilisation des médicaments vétérinaires dans les élevages avicoles modernes de la zone périurbaine de Dakar (Sénégal). Thèse : Méd. Vét. : Dakar ; 7
- [20]. Source : INRA. <http://www.tours.inra.fr/urbase/internet/equipements/abr.htm>.
- [21]. TATSADJIEU NGOUNE L., KEMGANG SONFACK TANEDJEU et MBOFUNG C. M.F., 2009. Impact de l'utilisation des antibiotiques sur la sensibilité des bactéries pathogènes de poules dans la ville de Ngaoundéré. Cameroon Journal of Experimental Biology, 5 (2) : 52-61
- [22]. TONA K., 2011. Etat des lieux de l'utilisation des produits pharmaceutiques dans la filière avicole au Togo. Riprostat, 24 : 7-11.

- [23]. **Wegener CH., 1999.** The consequences for food safety of the use of fluoroquinolones in food animals. *New England Journal of Medicine*, 30: 1581-1582.