Proc. 41st Conf. Nig. Soc. for Ani. Prod. 20-24 March, 2016. Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

PREVALENCE OF ANTIBIOTIC RESIDUES IN COMMERCIAL TABLE EGGS IN IDO LOCAL GOVERNMENT OF IBADAN, OYO STATE.

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Abstract
Poultry treated with pharmaceutical products can produce eggs contaminated with drug residues: such residues pose a risk to consumer health. In this study, prevalence of antibiotic residues in commercial table eggs sold in Ido local government area of Oyo state were evaluated. Twenty eggs each were bought from local retailers in Apata, Apete, Ijokodo and Omi adio. Five eggs from each location were randomly selected and evaluated for the presence of residues of gentamicin and enrofloxacin as described by Garrat. (2002). Result showed that all the twenty eggs screened tested positive for both gentamicin and enrofloxacin. There was significant difference (p < 0.05) in the antibiotic residues in the eggs and weight of eggs sampled from all locations. The study showed that all eggs sampled had antibiotics residues within the recommended limits, though eggs from Apata had the highest levels of enrofloxacin and gentamicin residues which may be due to their larger sizes. Therefore, great care should be taken to monitor antibiotic withdrawal periods before the release of table eggs for public consumption. In addition, strict legislation and ample compensation policies should be proffered in order to minimize the abuse of antibiotics

Key words: Poultry, eggs, antibiotic residues

Introduction
Antibiotics or antibacterials are a type of antimicrobial used in the treatment and prevention of bacterial infection (Donoghue, 2003).The use of antibiotics in animals is similar to their use in humans for the purpose of disease prevention and treatment (Gustafson, 1993). Today, antimicrobial drugs are used to control, prevent and treat infection and to enhance animal growth and feed efficiency (Tollefson and Miller, 2000). The most commonly used antimicrobials in food producing animals are the β-lactams, tetracyclines,aminoglycosides, lincosamides, macrolides and sulfonamides (Lee *et al.*, 2001).
In Africa, parallelto the incautious use of antibiotics in human medicine, agricultural sectors consume a large portion (50%) of antibiotics in animal farming to treat or to minimize potential outbreaks of diseases or to promote animal health (Miller *et al.*, 2003).However, there are no clear regulations controlling antibiotic contamination of feedstuffs in many African countries. Additionally, there is a clear lack of available information about antibiotic residues in animal-derived foods in Africa (Darwish *et al.*, 2013).
In poultry, antibiotics are used extensively for disease prevention and treatment. Antibiotics also favour growth by decreasing degree of activity of the immune system, reduce waste of nutrients and reduce toxin formation (Nisha, 2008). Antibiotic residues in foods of animal origin may be the cause of numerous health concerns in humans. These problems include toxic effects, transfer of antibiotic resistant bacteria to humans, immunopathological effects, carcinogenicity (sulphamethazine, oxytetracycline, furazolidone), mutagenicity and nephropathy (gentamicin), hepatotoxicity, reproductive disorders, bone marrow toxicity (chloramphenicol), allergy (penicillin) (Nisha, 2008).
The extensive use of antimicrobials in human and animals has led to increase in bacterial multidrug resistance among several bacterial strains. This phenomenon of multiple resistances represents a worldwide problem both for veterinary and public health sectors. Bacterial resistance is observed especially when the antibiotics are abundantly used and that the bacteria can be transmitted easily between the individuals (Bada-Alambedji *et al.*, 2006).
Drug residues in chicken eggs are of concern because relatively few drugs are labelled for laying hens, although several medications are approved for other production classes of poultry (Hofacre, 2006; Castanon, 2007). This study was carried out to determine the prevalence of enrofloxacin and gentamicin residues in commercial table eggs in Ido local government and to compare the relationship between egg weight and antibiotic residues in the eggs collected from the different locations.

Materials and Methods
Study location and sample collection:
Commercial table eggs were collected from four

communities (Apata, Omi-Adio, Ijokodo and Apete) in Ido local government of Ibadan Oyo State Nigeria. At each location, twenty eggs were randomly collected from different retailers available during the visit. Then five eggs were randomly selected based on their weight from the pool of eggs collected at each location.

Laboratory analysis: A total of twenty eggs were tested for antibiotic (enrofloxacin and gentamicin) residues using the methods described by Garratt (2002).

The absorbance of sample and working standards were read in a Jemray 6000 spectrophotometer at a wavelength 558 nm for enrofloxacin and 550 nm for gentamicin.

The quantity of antibiotic residue present in µg/kg was calculated using the formula:

$$\text{Antibiotic residue } (\mu g/kg) = \frac{\text{absorbance of sample} \times \text{Average gradient} \times \text{dilution factor}}{\text{Weight of samples}}$$

Statistical analysis: All data were subjected to one way analysis of variance (ANOVA).

Results and Discussion

From this study it was observed that all eggs sampled had antibiotic residues in them. Table1 shows the prevalence of antibiotic residues in commercial table eggs sampled in different locations. The result showed that there were significant differences in the antibiotics residues in table eggs sampled from different locations ($p<0.05$). The highest residues of enrofloxacin were obtained in eggs sampled in Apata while the eggs sampled in Omi-Adio had the lowest enrofloxacin residues. Also, highest gentamicin residue was obtained in eggs sampled in Apata and the lowest gentamicin residues were obtained in eggs sample from Omi-Adio. Table 2 shows the descriptive statistics of egg weight sampled in different locations. The result showed that there were significant differences in the egg weight ($p<0.05$). The highest residues of enrofloxacin were obtained in eggs sampled in Apata while the eggs sampled in Omi-Adio had the lowest enrofloxacin residues. Also, highest gentamicin residue was obtained in eggs sampled in Apata and the lowest gentamicin residues were obtained in eggs sample from Omi-Adio. Table 2 shows the descriptive statistics of egg weight sampled in different locations. The result showed that there were significant differences in the egg weight (p0.05) sampled from different markets. Eggs sampled in Apata were the heaviest while eggs sampled in Omi-adio were the lightest.

From the above results it was observed that there is a relationship between egg weight and antibiotic residues present in eggs. Apata recorded the highest values for weight and antibiotic residues in eggs and Omi- Adio which recorded the lowest weights also had the lowest values of antibiotic residues in eggs. This could be as a result of the use of these antibiotics as growth promoters so the higher the antibiotic use the bigger the egg as is the case in this study. High prevalence of antibiotic residues had also been reported in Ghana, Iraq, Belgium, Sudan, Malaysia, Nigeria (Annan-Prah *et al*., 2012; Shareef *et al*., 2009; Sasanya *et al*., 2005; Malik *et al*., 2013; Fagbamila *et al*., 2010). There is significant usage of the quinolone enrofloxacin in poultry production in some countries and there is a belief (and accumulating evidence) that the emergence of quinolone-resistant *Campylobacter spp* reflects the use of these drugs in veterinary medicine. The indiscriminate use of antimicrobials in livestock farming have resulted in increased resistance and these have been transmitted to humans via the food chain and thus have been the major cause of drug resistance in humans. Also, resistant strains not only hinder treatments but are also found to cause more severe illnesses in humans (Holmberg *et al*., 1984). Furthermore, consumption of a large amount of various animal products containing antibiotic residues by human may result in undesirable changes in bowel micro flora and create immunological reaction in susceptible persons (Mottier *et al*., 2008; Salehzadeh *et al*., 2006; Nafisi *et al*., 2008).

Conclusion

It can be concluded from this study that enrofloxacin and gentamicin residues are found in eggs in Ido local government though the residues were within the maximum recommended limits. It could be recommended that the use of antibiotics should be reduced and when used, it should be administered in accordance to the dosage recommended by the manufacturer. Also farmers should adhere to withdrawal periods of drugs. The misuse of antibiotics may result in the aforementioned health hazards yet its reduction may result in reduced revenue for the farmer due to the increase in mortality rate. In order to achieve such a reduction, the following recommendation should possibly be considered with regard to all antibiotics usage in poultry:

- The effective prevention of infectious diseases and the adoption of strict hygiene standards and rearing skills may reduce our need for antibiotics, particularly in the veterinary field.

- The use of alternatives to antibiotics, such as plant-derived antimicrobial substances and probiotics, may represent a promising option.
- The reduction of prophylactic antibiotic use should also be considered.
- Strict national legislation must be passed around the world to avoid the unnecessary use of antibiotics.
- Avoid using antibiotics in the veterinary field without a veterinarian's prescription.
- Regulating the sales of veterinary drugs.
- Restricting the manufacture and marketing of medicated poultry feed, encouraging farmers to form cooperatives in order to access bank loans to insure their farms.
- Strict observation of antibiotic withdrawal period should also be made.

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Table 1: Prevalence of antibiotic residues in commercial table eggs from different locations.

Antibiotic residues	Apata	Apete	Ijokodo	Omi-adio	SEM ±
Enrofloxacin	40.55[a]	18.09[b]	15.77[b]	14.87[b]	2.46
Gentamicin	42.42[a]	40.64[b]	36.88[c]	36.58[c]	0.48

a b c of means of different superscripts along the same row are significantly different ($p<0.05$)

Descriptive statistics of egg weight (g) sampled in different locations

Location	N	Mean	SD	Min	Max	CV
Apata	5	62.71	0.21	62.39	62.95	0.34
Apete	5	62.00	0.14	61.88	62.24	0.23
Ijokodo	5	59.22	1.81	57.79	61.34	3.05
Omi-adio	5	58.54	0.85	57.71	59.55	1.46

n~sample size, Sd-Value, Cv-coefficient of variation.