

DETECTION OF ANTIMICROBIAL DRUG RESIDUES IN MEAT FROM BUNAJI CATTLE SLAUGHTERED IN MINNA MODERN ABATTOIR

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ABSTRACT

Antimicrobial drug residues are of global health concern in many countries of the world, with Nigeria reporting occurrence of residue contamination of edible animal products beyond FAO and WHO permissible levels. The occurrence of antimicrobial drugs residues in meat in Minna modern abattoir was investigated during this study, 56 meat samples were collected from 56 Bunaji cattle slaughtered in the abattoir at 2weeks intervals for period of 4months (April – August 2019) . Antimicrobial inhibition test was adopted with zone of inhibition measured in millimetres (mm), samples below 1mm were considered negative. 29(51.78%) samples were tested positive with zone of inhibition at various levels of residue (12mm, 13mm, 15mm, 17mm, 19mm and 20mm), which signified high levels of residue. Samples from female's cows had the highest number 20(68.90%) and values at 20mm. Ages between 6-10 years had 17(58.62%) while the lowest residue was recorded at older animals above 10 years 5(17.24%). This result indicated that consumers in Minna metropolitan are predisposed to health hazards due to the presence of antimicrobial residue, this emphasis the need for effective prevention of infectious diseases, general enlightenment on the withdrawal periods, and establishment of antimicrobial residues monitoring unit in Minna.

Keywords – Antimicrobial residue, Meat, Microbial inhibition test, Abattoir, Minna

INTRODUCTION

Drug administration to domestic animals requires not only consideration of its effect on the animals but also the effect on humans who consume the product from such animals. Antibiotics are natural product of microorganisms or identical synthetic products or similar semi-synthetic products that inhibit the growth of or destroy microorganisms (Kabis, 2007). In animal health practice, antibiotics are widely used as therapeutic prophylactic or as growth promoting agents (Donoghue, 2003). Antibiotics are of different types, with various pharmacokinetic activities which often neglected during slaughter, and hence become potential hazard to human. The presence of antibiotics in meat and other food of animal origin is one of the most important indices for their safety to human consumers (Kozanova *et al.*,2001). Many livestock farmers administer antibiotics indiscriminately for purposes of treating or preventing an ailment or as growth promoters without cognisance of the need to consult an expert for necessary advice, such animals are often slaughtered without recourse to the withdrawal period, even if they used the same drugs as animal health personnel's. The Indiscriminate use of antibiotics in livestock has raised serious public health concern globally, especially in sub-Sahara Africa and particularly Nigeria (Shehu, 2018).

Drug residue arises when treated animals are slaughtered without recourse to pharmacokinetics of the specific drug administered, this situation usually occur with prolonged administration and over dosage of antimicrobial agent, especially if these animals are slaughtered immediately,(vinedresser, 1989)as cited by (Gabriel *et al.* 2012). Toxic level of antimicrobial residues in food animals are known to cause divers health hazards to susceptible unsuspecting human consumers. (Gabriel *et at.*,2012).

Cattle command a prominent position in our meat supply which constitute of about 45% of meat industry. Presently cattle population in Nigeria has been estimated as 15.3million (Umar, 2007).

Bumaji cattle are the most predominant and wide spread of all Nigeria cattle breed, they represents 37% of the national herd (Alphosus, Akpa, Barje and Adamu, 2012). About 800-1000 cattle, sheep and goat are slaughtered daily across Niger state (Dukku, 2018), the abattoir where these animals are largely slaughtered and processed for public consumption, contributed immensely to the economic development of states. In Nigeria as in many other countries, the veterinary structure are not strong (Fau, 2004) and are characterised by indiscriminate usage of veterinary drugs such as antibiotics, which are readily available and obtainable over the counter as well as every rural cattle market, which make it easily accessible to different categories of livestock handlers including the nomadic pastoralist and the middle men. With this development it implies that correct dosage and withdrawal period are not usually adhered to, and hence meat safety quality assurance cannot be granted, Olatoye and Ogundipe, (2009).

MATERIALS AND METHOD

EXPERIMENTAL SITE

The samples were collected from Minna abattoir located along Tayi village in Minna Niger state of Nigeria. Minna the capital city of Niger state is situated on a latitude 9 3105 and longitude 7 421 north, with annual rainfall of 1,200-1,300mm and mean temperature of 38-40c the area has an altitude of 1,46m above sea level in the northern guinea savannah vegetation zone of Nigeria it is characterised by two season, the wet season (April - October and dry season November -march). NSFCO/ ADP.,(2015).

SAMPLES COLLECTION

Fifty six (56) Beef samples weighing 50g were collected from 56 slaughtered white Fulani cattle in Minna modern abattoir for a period of 4 months, (April - August 2019) at 2 weeks intervals, with emphasis to breed, age sex and time intervals, Samples were properly packed and labelled in a polyethylene and refrigerated at -20⁰C

SAMPLE ANALYSIS;

MICROBIAL INHIBITION TEST

An adapted microbial inhibition test was employed to screened samples for evidence of antimicrobial drug residues as described by Huber et al, (1969). Mueller Hinton Agar (MHA) was prepared in plates according to manufacturer`s instruction. *Bacillus subtilis* ATCC 6633 was used as test organism. Plates were inoculated with the test organism by dipping sterile cotton swab sticks into the suspension of test organism until saturated. The MHA plates were then gently but thoroughly swabbed uniform to achieve a lawn of confluent growth and allowed to dry for 5 minutes. The extract from the sample were tested by dipping sterile 1.2 mm diameter *whatmann* filter paper disc into the juice extract, until saturated, excess sample were allowed to drained, then, *whatman* filter paper disc containing 30ug of oxytetracycline Hcl was used as control discs, placed at the centre of the plates with test discs at the periphery of the plate and incubated at 37 degree for 18 – 20 hrs, after which presence or absence of zone of inhibition and that of the disc was calculated. Any disc with a difference of >1mm was considered positive.

DATA ANALYSIS;

The data obtained was subjected to descriptive statistical analysis, for the variations between occurrence of drug residues between sex and Age groups, using SPSS version 16.0, (2010)

RESULTS AND DISSCUSSION

Out of the 56 meat samples from 56 cows of different sex and age that were screened for antimicrobial drug residues during this study, 29(51.78%) tested positive under zone inhibition test ranging from 13mm to 20mm, indicating presence of antimicrobial drug residue in the samples; 27(48.21%) were tested negative less than 1mm. All samples were collected from Bunaji cattle in Minna abattoir. The overall results from this study indicated a high incidence (51.78%) of antimicrobial residues in the meat consumed by the public in Minna metropolitan The

results is higher than the reported incidence of 46% residue in beef in Oyo state, (Akinwumi, 2012); 16.11% reported by (Dipeolu and Alonge 2002); 33.1% obtained in broilers (Kabir *et al.*, 2004); 25% reported in milk (Yusuf *et al.*, 2017). However the result is lower than 89.3% reported from kidney and urine (Gabriel *et. at.*, 2012) and 79.74% in edible beef (Olatoye and Ogundipe, 2009). **Table 1** Shows distribution of residue on Sex of the cows that were tested positive, 9(31.02%) were males, 3 samples had highest value of 19mm while 1 sample had lowest value of 12mm, females recorded highest antimicrobial residue of 20(68.96%), 2 samples had highest zone inhibition value of 20mm while 1 had lowest of 12mm, the study recorded high incidence of residues on females (68.9%) than males (39.01%), 2 females had high zone inhibition value of 20mm. **Table 2** shows variation on Age, 7(26.3%) were between 1-5 years, 17(53.62%) were between 6-10 years and 5((17.24%) where above 10 years. At 1-5 years 2 samples had highest value of 19mm and the lowest value of 13mm, highest value of 20mm was found at 6-10years and above 10 years respectively, From the result 6-10 years shows 58% residual values than other age groups the result agreed with that reported by (Zeenatudeen, 2015) on milk.

Table 1 Distribution of antimicrobial drugs residue based on Sex of cow under zone inhibition above 1mm detectable limit

Sex	Meat sample	12mm	13mm	15mm	17mm	19mm	20mm	Total
Male	9	1	1	4	1	3	0	9(31.02%)
Female	20	1	4	4	6	3	2	20(68.96%)
Total	29	2	5	8	7	6	2	29(100%)

Table 2; Distribution of antimicrobial drugs residue based on Age of cows under zone inhibition above 1mm detectable limit

Age years	Meat sample	12mm	13mm	15mm	17mm	19mm	20mm	Total
1-5	7	Nil	Nil	3	2	2	0	7(24.13%)
6-10	17	1	4			3	1	17(58.52%)
Above 10	5	Nil	1	3	5	1	1	5(17.24%)
				2	Nil			
Total	29	1	5	8	7	6	2	29

CONCLUSION

The high percentage of meat with antimicrobial residues obtained from this study indicated that, consumers in Minna metropolitan are predisposed to health hazards due to the presence of antimicrobial residue in meat in slaughtered animals from the abattoir, this emphasizes the need for the enforcement of antimortem inspection, effective prevention of infectious diseases, general enlightenment on the withdrawal periods, and establishment of antimicrobial residues monitoring unit in Minna.

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