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Short Communication

Preliminary Screening of Beef Consumed in Ibadan, Nigeria for Antibacterial Residues

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ABSTRACT: Three hundred and ninety samples each of liver, kidney and muscles from abattoirs in Ibadan were screened for the presence of antibiotics residues using a rapid microbiological assay. Premi®Test**,** a commercially available kit containing agar pre-seeded with *Bacillus stearothermophilus*, sensitive to most commonly used antibiotics providing a simple and quick response to presence of antibiotics was used. The results showed that 816 samples (69.74%) out of a total of one thousand one hundred and seventy edible beef samples screened contained antibacterial residues. The positive samples comprised of 320 (40%), 281 (34%) and 215 (26%) kidney, liver and muscle samples respectively This is indicative of high risk of exposure of the consumers to wide range of antibacterial residues that have found their ways to the food chain through improper usage of the drugs in food animals. There is need for detailed drug residues risk assessment, surveillance and proper regulatory control of health management practices in the production of food animals in Nigeria to ensure food safety.
Key Words: antibiotics residues, meat, food safety, meat, Premi®Test.

INTRODUCTION

Food safety is an integral aspect of food security which is the global focus to feed the growing population. Challenges or threats of bacterial infections to food safety and improvement of productivity are the main thrust for the usage of antibiotics in livestock. In Nigeria, as in many developing countries the veterinary structures are not strong (FAO 2004) and are characterized with indiscriminate usage of veterinary drugs including antibiotics which are obtainable over the counter and are accessible to lay men including the nomadic pastoralists (Dina and Arowolo 1991, Olatoye and Ogundipe 2004). This implies that correct dosage and withdrawal periods of antibiotics are not usually adhered to and food safety quality assurance can not be guaranteed.

Several studies on drug residues in Nigerian meat by other authors (Oboegbulem and Fidelis, 1996; Dina and Arowolo 1991 Dipeolu and Alonge, 2002 Kabir *et. al* 2004) employed the traditional microbial inhibition tests requiring up to 18 hours and above for incubation. Hence the application is difficult and impracticable in Nigerian abattoirs where ante-mortem inspection is not routinely carried out and the postmortem inspection is often hurriedly carried out (Adeyemo 2002). Ibadan in Oyo State, Nigeria is the largest city in West Africa and the second largest in Africa, with land area of 240km^2 and a population of 1, 222, 570. The city is located on geographic grid reference longitude 3^0 5E, latitude 7^0 20N (Filani 1994). The three tiers of government in Nigeria (Federal, State and Local Government) participate in meat hygiene and inspection, however the local government authorities (LGA) are allowed legally to own slaughter slabs and abattoirs within their boundaries, subject to the approval of the supervising state veterinary division and high demand for food including beef. Animals slaughtered in Bodija abattoir accounts for 65.93% of the total animal in Oyo state (Abiola 1995). There is need for quality assurance of the meat beyond physical ante- and post-mortem organoleptic inspections through rapid screening techniques that can be used to assess detail safety of the meat before they are passed for human consumption.

Manuscript received: March 2009; Accepted: June 2009
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Premi®Test developed and validated as a screening test based on the inhibition of growth of Bacillus stearothermophilus, a thermophilic bacterium sensitive to many antibiotics (Stead et al. 2004) employed in the detection of antibiotics residues in meat within 3 hours of slaughter was used in this study to determine the incidence of antibacterial residues in meat derived from Ibadan abattoir and slaughter slabs.

MATERIALS AND METHODS

One thousand one hundred and seventy edible samples of liver, muscles and kidney (10grammes each) were randomly obtained from slaughtered cattle in Bodija abattoir, Basorun, Iwo Road and Apata slaughter slabs in Ibadan city over a period of six weeks. A total of 4800 heads of cattle were slaughtered for public consumption from which samples were randomly collected at these locations during the period of the study. The samples were kept frozen until the time of analysis. Approximately $2cm^3$ of each meat was cut into the meat press to extract the meat juice into a Petri dish. Using a micropipette, 100µl was carefully drawn onto each ampoule of the pre-seeded agar. The agar with the extract were allowed to stand for 20 minutes for pre-diffusion at room temperature and then flushed carefully twice with distilled water. The agar was drained of the extract and water the ampoules were closed with foil. These were incubated in the heating block for 3 hours at 64^0C. The results were observed through colour change indicator in the agar.

RESULTS

Out of a total of the 1170 samples screened during this study, 816 (69.74%) were positive for antibacterial agents. Bodija abattoir had the highest positive values of 72.4% (comprising of 88.00%, 73.20% and 56.0% of kidney, liver and muscle samples respectively) positive for antibiotics residues (Table 1) followed by Bashorun with 70.0% of kidney, 75.0% of liver and 50.0% of muscle samples positive and Iwo road with 86.67% of kidney, 73.33% of liver and 60.0% of muscle were also positive and 60.0% of kidney, 63.33% of liver, and 56.67% of muscle from Apata slab had antibacterial residues. Table 2 also shows the result of the positive values in different organs screened with residues obtained more in liver and kidney than in the muscle.

DISCUSSION

The result of this study indicates a high 69.74% incidence of antibacterial residues in the meat and organs being consumed by the public in Ibadan metropolitan. This result was higher than the reported antibacterial residues incidence of 7.4% in slaughtered cattle (*13*) and 33.1% antibacterial residues in broiler meat from northern Nigeria (*14*) and the reported incidence of 16.63% streptomycin and 15.0% oxyteracycline residues by from the cities in South Western Nigeria (*8*). These results were obtained using the traditional microbiology inhibition methods that involved overnight incubation However, the high result in this study could be due to indiscriminate use of combinations of different antibiotics by nomadic pastoralists and cattle marketers. Several authours have earlier reported the widespread misuse of veterinary drugs in Nigeria (*7, 16, 4*). Veterinary drugs are obtainable over the counter and are mostly administered without prescription and compliance to withdrawal periods in most countries Africa.

Table 1:
Result of screening of slaughtered cattle from Ibadan main abattoir and the slaughter slabs.

Abattoir/slaughter slabs	Number of samples	Number of positive (%)
Bodija	750	543 (72.40%)
Basorun	240	156 (65.00%)
Apata	90	54 (60.00%)
Iwo road	90	63 (70.00%)
Total	1170	816 (69.74%)

Table 2:
Result of the organs screened and the positive samples

Organ samples	Number screened	Number positive (%)
Muscle	390	215 (55.13%)
Liver	390	320 (82.05%)
Kidney	390	281 (72.05%)
Total	1170	816 (69.74%)

The lower percentage of positive samples at the slaughter slabs compared to those derived from the major abattoir could be due to the fact that the few animals slaughtered at the slabs might have been rested before slaughter. This allowed for metabolism of drugs that were administered. Available records also indicated that some of the animals were sourced from more enlightened cattle fatteners that are springing up within the urban and peri-urban centers. Kidney and liver samples yielded more positive result for the drug residue than muscle. This agreed with findings of most workers (15, 8) on residues since they are the organs of

metabolism and excretion of the drugs. The choice of these organs as delicacies by some consumers portent greater risk of accumulation of residues in this group of consumers. Some residues in the muscles may not be released from the protein bound in the muscle tissue by mere pressing could also result in false negative results. The high prevalence of residues in Nigerian meat portent public health hazards such as bacterial resistance, gastro-intestinal disturbances carcinogenic effect, teratogenic and immunological disorders (*6*, *10*). The sensitivity of PremiTest® notwithstanding, confirmation by more specific physico-chemical extraction and quantification will allow assessment of specific antibiotic residues comparable with international standards of maximum residue limits (MRLs) and acceptable dietary intake (ADI) in the meat being consumed by the public. This will ensure the meat quality assurance and food safety both for the health of the local consumers and possible participation in international meat trade by Nigeria being a member of World Trade Organisation. In summary, the high percentages of meat with antibiotic residues demand urgent need for national residue monitoring, surveillance programs, a challenge to participate in Codex matters on animal health and to institute efficient regulatory control of veterinary drugs and other inputs for food animals in Nigeria.

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