

**ASSESSMENT OF ANTIMICROBIAL USAGE AND ANALYSIS OF
SULFONAMIDE RESIDUES IN BROILER MEAT FROM PERI- URBAN NAIROBI**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

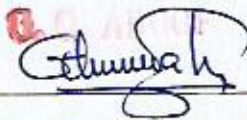


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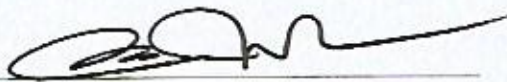
This thesis has been submitted for examination with our approval as University supervisors



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ABSTRACT

Antimicrobial drug residues in food of animal origin have become a major public health concern due to increase in the use of antimicrobials in farm animal production. Livestock farmers' knowledge, attitude and practice regarding the use of antimicrobials play a significant role in determining the presence of antimicrobial drug residues in livestock products.

A study was carried out in Njiru and Kasarani sub counties of Nairobi County with the objective of assessing the antimicrobial usage in broiler farms and analyzing sulfonamide residues in broiler meat. Structured questionnaire was administered to 30 broiler farmers in the study area to obtain information on general farm demographics, broiler production structures and systems, local knowledge and understanding on the issues surrounding poultry diseases and usage of antimicrobial drugs. A total number of 90 broiler chicken thigh muscles were collected at the farm during routine slaughter, packed in polythene bags, labeled and transported in cool boxes with ice packs to the Department of Public Health, Pharmacology and Toxicology, University of Nairobi laboratory for storage at -20°C until the time of extraction.

Data were tabulated and analyzed using Microsoft Access R-studios Version 0.98.1091- © 2009-2014 and Insta+ v3.36 statistical package. Extraction of sulfonamides from meat sample was performed using acetonitrile/water mixture at a ratio of 1:1, followed by clean up on solid phase extraction cartridges. Analysis of three commonly used sulfonamides: sulfadimidine, sulfachloropyridazine and sulfamethoxazole was carried out with High Performance Liquid Chromatography(HPLC) performed at 30°C with 0.01M potassium dihydrogen phosphate buffer and acetonitrile at 70:30, v/v as mobile phase at flow rate of 1.0

ml/min. Sulfonamides were sufficiently separated for quantification and analyte had a retention time of 5.560 minutes for sulfadimidine, 7.130 minutes for sulfachloropyridazine and 8.425 minutes for sulfamethoxazole.

The study found that 80% of the farmers interviewed treated their own broilers by administering the drug in drinking water. The most frequently used antimicrobial drugs were sulfonamides (55%) and tetracycline (23%). Fifty percent of the farmers sold broilers during the drug administration period for two main reasons;-to avoid incurring losses (100%), and buy feeds for the remaining birds (60%). Out of the 90 broiler meat samples analyzed, 57.7% had detectable levels of the sulfonamides. Sulfamethoxazole was detected in most samples (36.7%) while sulfachloropyridazine was least detected (4.4%). There was an association between the slaughter of broilers during the drug administration and the broiler meat sample exceeding the maximum residue limit. (Chi square value $\chi^2=3.97$, $p < 0.05$). The study also showed that 13.3% of the samples had the mean sulfonamides concentration exceeding the acceptable Maximum Residue Limits by Codex Alimentarius Commission of 0.1 μ g/g.

In conclusion, the study noted that broiler farmers had access to common antimicrobial drugs used to treat and control diseases in broilers; they were also aware of the adverse effects of antimicrobial drug residues in broiler tissue to human health.

The study recommends the relevant authorities to enforce the existing legislations to curb abuse and misuse of antimicrobial drugs by livestock farmers. Alternative disease control strategies such as vaccination, management and biosecurity should be used to reduce usage of antimicrobial drugs in livestock treatment.