

## Food Safety

### 412 Residue of three fluoroquinolone (ciprofloxacin, norfloxacin, and ofloxacin) in commonly consumed meat products.

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The study was conducted to investigate residue of 3 fluoroquinolone (ciprofloxacin, norfloxacin, and ofloxacin) in commonly consumed meat products in the study area. Microbiological assay, followed by HPLC, was used to screen market-ready meat for residues of 3 fluoroquinolones. Three hundred twenty samples, comprising 80 each of beef, chicken, pork, and chevon (goat) were collected from open markets. Initial screening by microbiological assay revealed that 50%, 55%, 40% and 40% of beef, chicken, pork and chevon respectively were positive for residues of antibiotics to which *Escherichia coli* was susceptible. Further analysis revealed the presence of ciprofloxacin, norfloxacin and ofloxacin and varying concentrations in the different meat types. Overall mean concentration of ciprofloxacin was 242.50 µg/kg, which differed significantly ( $P < 0.05$ ) from the means of 80.86 µg/kg and 33.46 µg/kg for norfloxacin and ofloxacin respectively. Mean ciprofloxacin was highest in chevon (345.62 µg/kg); beef had the highest concentration of norfloxacin and ofloxacin at 173.40 µg/kg and 79.28 µg/kg respectively. Ofloxacin was the least in frequency and abundance in all meat types. Results obtained in this study have practical implications for public health and will lead to steps that will further enhance the safety of foods originating from animals to protect the animal production industry.

**Key Words:** fluoroquinolone, meat, residue

### 413 Abattoir waste management practices in Ibadan metropolis.

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The study evaluated waste management practices in 2 major abattoirs in Ibadan, South West, Nigeria, through investigative survey/questionnaire, to educate dwellers in the vicinity of the danger abattoir operations pose to health and to assess the ethical practices of abattoir operators. Water samples taken from well water around the abattoirs were assessed for selected physical, chemical and microbiological properties. General Linear Model (GLM) procedure was used for statistical analysis. The survey showed that 100% of abattoir operators in both abattoirs disposed waste manually using spade, 90% sweep and wash the waste into open drainage, eventually flowing into streams and rivers around, 90% do not treat waste in any way before dumping at sites. All these give rise to the offensive odor and stench characteristic of the abattoir environment, leading to eutrophication. Study further showed that though the residents of the two abattoirs were aware of the danger abattoir operations pose to their health, majority of them (63%) were not ready to move from this vicinity. Water samples from the wells taken for analysis for physical, chemical and microbiological properties showed that heavy metal concentration-Cu (0.00) and Pb (0.00) at both abattoirs, Fe-0.00 at Bodija, 0.05± 0.01 at Akinyele, Zn-0.03 ± 0.03 and 0.16 ± 0.03 at Bodija and Akinyele respectively were not significantly different from each other, and were below the maximum permissible limit. Turbidity, total dissolved solids (TDS) and total suspended solids (TSS) were significantly different from each other in the two abattoirs. Total aerobic count (TAC) and coliform count (TCC) were  $2.1 \times 10^6$  and  $6.3$

$\times 10^5$ , respectively, in the well water at Bodija, while TAC and TCC were  $1.7 \times 10^6$  and  $7.6 \times 10^5$  in wells at Akinyele. High biochemical oxygen demand (BOD) of  $7.05 \pm 0.25$ , dissolved oxygen (DO)  $6.30 \pm 0.14$  and TAC of  $2.8 \times 10^6$  obtained on Wednesdays in both locations, significantly differed from those of Fridays. The high microbial load and its health implications further confirm the need to treat abattoir waste rather than discharge them to the environment. Portable water should be provided for operators.

**Key Words:** abattoir, waste management, food safety

### 414 Bioaccumulation of heavy metals, phenol, and polycyclic aromatic hydrocarbons in differently singed, skin-on, red Sokoto buck goats.

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The safety of skin-on meat obtained from singed carcasses is a matter of public health concern. This study was therefore carried out to investigate the concentration of heavy metals [lead (Pb), cadmium (Cd), zinc (Zn), manganese (Mn) and copper (Cu)], phenol and polycyclic aromatic hydrocarbons (PAH) in red Sokoto buck goat carcasses singed using fire wood, kerosene, scrap tire and liquefied gas (LG). A total of 24 good grade red Sokoto buck goats weighing between 18 and 20 kg were randomly distributed into each of the 4 treatments in a completely randomized design. Each treatment was replicated 6 times. The total PAH and phenol contents were determined by HPLC, whereas the minerals were measured by atomic absorption spectroscopy (AAS). PAH levels were highest ( $P < 0.05$ ) in scrap tire singed carcasses (0.040 mg/kg) and least in LG singed carcasses (0.001mg/kg). Pb and Mn were below detectable limit in carcasses singed with LG while the concentrations were similar ( $P > 0.01$ ) in the other treatments. Cd was not detected in any of the treatments. Zn concentration was highest ( $P > 0.05$ ) in carcasses singed with kerosene (0.005mg/kg). The level of phenol ranged from 0.02 Gae/kg in LG singed carcasses to 0.38 Gae/kg when scrap tire was used. Material used in singeing was found to have profound effect on heavy metal, phenol, and PAH depositions on skin-on meat from red Sokoto buck goats.

**Key Words:** skin-on, singed carcass, heavy metal

### 415 Antibiotic resistance of bacteria from commercial silages in Israel.

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Antibiotic resistance has become a major issue in health care treatment with the emergence of multidrug resistant pathogens, which is attributed to the excessive use of antibiotics in medicine and in agriculture. Accumulating evidence suggests that agricultural sources such as sewage effluents, biosolids and animal manure are potential sources of antibiotic resistant bacteria and resistance genes. The objective of the current study was to determine the magnitude of antibiotic resistance in lactobacilli and enterobacteria in commercial wheat and corn/sorghum silages in Israel. Mixed corn-sorghum silage and wheat silage were sampled at 2 commercial cattle feeding centers in Israel. Grab samples were taken at a depth of 10 cm from the center (pH = 3.9 in both silages) and shoulders (pH = 6.8 and 4.4, respectively) of each bunker silo. Isolates

of *Enterobacteriaceae* and *Lactobacillus* were screened on ampicillin, tetracycline, ciprofloxacin, ceftriaxone, erythromycin kanamycin and vancomycin. Surprisingly, in both types of silage, the vast majority of lactobacilli isolates were resistant (based on EUCAST MIC clinical breakpoint values) to all the 7 tested antibiotics. These isolates are currently being screened for the presence of clinically relevant antibiotic resistance genes to determine the potential for horizontal-transfer to other bacteria. The resistance of the enterobacterial isolates was significantly lower than that of the lactobacilli, however all of the isolates

were resistant to at least 2 of the 5 tested antibiotics, and some isolates were resistant to all 5. Interestingly, isolates from the corn-sorghum silage (sewage irrigation) were significantly more resistant than those isolated from the wheat silage (rain irrigated) (resistant to 3.25 of the screened antibiotics vs.2.5, respectively). This study demonstrates the vast scope of antibiotic resistance in silage, which may contribute to antibiotic resistance propagation through the food chain.

**Key Words:** silage, antibiotic resistance