**Escherichia coli O157 serotype in beef carcasses post slaughterhouse in Nairobi and Eldoret, Kenya**

John Kago1, Erastus Kang’ethe2, John Wangoh1, Kohei Makita3

1University of Nairobi, Dept. of Food Science, Nutrition and Technology, Kenya
2University of Nairobi, Dept. of Public Health, Pharmacology and Toxicology, Kenya
3Rakuno Gakuen University, Veterinary Epidemiology, Japan

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**Introduction**

Meat is an important source of protein in human nutrition. The production and consumption trends show an increase in the demand for meat in developed and developed countries (de Haan, 2006). Population increase in Kenya may push the industry to process most of the meat for preservation and distribution instead of consuming freshly slaughtered meat. This offers a challenge especially due to the zoonoses arising from contamination with pathogenic microorganisms during handling and processing. Escherichia coli O157:H7 has been associated with food poisoning outbreaks in various parts of the world. Most of them are from contaminated meat that has been undercooked(Lake et al, 2002). Prevention of contamination and cross contamination of meat during slaughter and distribution is critical in prevention of these outbreaks. As carcasses in Kenya are distributed to various retail shops after slaughter, the transportation chain need special attention!

The objectives of the study were to determine the probability and identify the risk factors that lead to carcass contamination with E. coli O157 serotype during transportation to the butcher.

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**Materials and methods**

Two slaughterhouses from Nairobi and one from Eldoret were purposively chosen. Randomly selected 250 beef carcasses were sampled in a cross-sectional study. Swab samples from a single carcass were obtained from three sites during loading and offloading of meat to carriers. A fault tree was used as a guide on possible areas of contamination. A total of 1600 samples were obtained. E. coli O157 serotype was isolated and purified using sorbital MacKokey, MacKokey and nutrient agar. Serotyping was by card agglutination test. Oxiid rodtest test kit was used to test for verotoxin (VT1 and VT2) production. The meat carrier environment (humidity and temperature) was monitored. Knowledge, attitude and practices of meat transporters was assessed through a semi structured questionnaire and observations. The probability of contamination was modeled and run through Monte Carlo simulation using winBUGS®. Prevalence of E. coli O157 serotype contaminated carcasses and data from the questionnaire were analysed using SPSS ver17.

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**Results**

**E. coli O157 serotype carcass contamination**

The level of Escherichia coli O157 serotype contaminated carcasses was significantly higher at offloading than at loading (p=0.05). The prevalence of contaminated carcasses at loading and offloading was 0.4% and 2.4% respectively. There was no significant difference on level of contamination among the three abattoirs at the two levels of sampling. Monte Carlo simulation gave the probability of obtaining an E. coli O157 serotype contaminated carcass as shown in figure 2.

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**Figure 3:** A picture of carcasses inside a transportation box

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**Conclusions**

The prevalence at loading is low may be due to the short time taken by the carcass after the slaughter process before dispatch. The washing after evisceration could have contributed to low levels as a previous study done in the abattoir showed high carcass contamination (Mwai 2012, Kang’ethe 1993)

Prevalence at offloading increased due to bacterial growth and cross contamination during transportation. The factors leading to this are as shown in figure 5.

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**References**


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**Literature cited**


**Figure 1:** Pictures showing meat transportation chain in Kenya.

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**Figure 4:** Meat being offloaded from transportation box

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**Figure 5:** Factors that lead to high prevalence at offloading as compared to loading.

Training of the meat transporters to sensitize them on good hygiene and manufacturing practices could reduce the high prevalence at offloading. FAO (2006) identifies control of temperature and good hygiene practices as practical risk management tools towards eliminating pathogen from carcasses. Martins et al (2012) conclude that training is key if food handlers are to practice good hygiene.

Refrigeration of carcasses before transportation and/or proper construction of transportation boxes according Kenya Meat Control Act Cap3586 would ensure controlled temperature and slow microbial growth.

The Kraft papers used to separate carcasses could be contaminated. The carcasses should be transported hang on rail. Other easily sterilized food grade material like films and aluminium foils could be used.

The risk the E. coli O157 contamination pose to the consumers has not been quantified. The actual burden of the disease could be causing in Kenya needs to be quantified and the control measures identified. The effects may not be so pronounced now as few reports on illnesses have been reported. The increased population and demand for food that require minimum preparation time, may revert this situation unless carcass contamination and bacterial proliferation is controlled.