

## Original Research Article

## Abscessations and Their Associated Microorganisms in Slaughtered Cattle at the Kumasi Metropolitan Abattoir, Ghana

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**Abstract:** Antemortem and post-mortem examinations were conducted on 1,268 cattle slaughtered at the Kumasi abattoir from October 2015 to March 2016, in order to determine the prevalence of organ abscessations and their associated micro-organisms. Pus was aseptically collected from 28 affected carcasses, stored on ice packs and transported to the Regional Veterinary Laboratory, Kumasi for bacteriological examinations. The samples were cultured on nutrient agar, MacConkey agar and blood agar media and micro-organisms were identified from formed colonies by their growth patterns on the media and gram staining properties. Micro-organisms which failed to grow on selected media were subjected to Ziehl Neelson's test. The prevalence of abscessations was 6.62%. *Staphylococcus spp*(27.9%), *Escheria coli*(14.9%), *Streptococcus spp*(19.1%), *Proteus spp*(10.6%) and non- lactose fermenting organisms (8.5%) were isolated in abscesses. *Mycobacterium spp*( 19.2%) was isolated in carcasses with multiple organ abscessation. It is recommended that carcasses with multiple organ abscessations be tested for *Mycobacterium spp* ,before being certified wholesome for human consumption.

**Keywords:** abscessation, cattle, microorganism, abattoir.

### INTRODUCTION

Meat is an important source of animal protein. In Ghana, cattle, sheep, goats and pigs are slaughtered at approved abattoirs and slaughter houses under veterinary supervision.

In sub Saharan Africa , whole carcasses and organs of cattle are rejected due to pathological conditions such as cysticercosis, hydatidosis, fasciolosis, abscessation , tuberculosis and liver cirrhosis (Asefa *et al.*, 2015, Lati *et al.*, 2015, Abunna *et al.*, 2008 ; Ayele *et al.*, 2004).

In Ghana the major causes of carcass and organ condemnation in cattle include: pimply gut, abscessation, fasciolosis, tuberculosis, jaundice, pneumonia and cysticercosis (Atawalna *et al.*, 2016; Jarikre *et al.*, 2014).

Abscessation affect visceral organs such as lungs, liver, kidneys, heart and spleen and are commonly associated with financial and public health

implications (Fufa and Debele, 2013, Yifat *et al.*, 2011, Raji *et al.*, 2010).

Information is scanty on the microorganisms responsible for causing animal abscessation in Ghana. This study will therefore investigate the prevalence of organ abscessation and their associated microorganisms in slaughtered cattle at the Kumasi abattoir.

### MATERIALS AND METHODS

The study was conducted from October 2015 to March 2016 at the bovine slaughter unit of the Kumasi Abattoir Company Limited (KACL). The abattoir was visited twice weekly during the study period. Routine ante-mortem and post-mortem inspections were conducted on the carcasses of cattle slaughtered between the hours of 10 am and 12pm daily, by trained veterinary staff (FAO, 1994). Slaughtered cattle with abscessation were identified by sex and type of organ affected and their numbers recorded. Abscesses were dissected with sterile surgical blades and sterile swabs were used to collect

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pus aseptically from affected organs. The collected samples were stored in sterile plastic containers in an ice chest and then transported to the Regional Veterinary Laboratory, at Kumasi. A total of 28 samples was collected from 28 cattle carcasses from different affected organs. An average of three samples were taken per visit. In the laboratory the samples were stored in the refrigerator at 4°C and examined the next day after collection.

Swabs were inoculated into plates of nutrient agar, MacConkey and blood agar and incubated at 37°C and examined after 24 hours for bacterial growth. Colonies were picked from the media and smears made for gram staining. Microorganisms were identified by their growth patterns on media and gram staining properties (Carmen, 1990).

Samples which failed to grow on selected media were subjected to Ziehl-Neelson’s staining technique for Mycobacterium spp.

**RESULTS AND DISCUSSIONS**

The overall prevalence of abscessation for the study period was 6.62%. There was no significant difference between month of slaughter and abscessation (Table 1). However the highest (10.37%) prevalence was in January, while the lowest (3.17%) was in March.

The prevalence of abscessations (6.62%) was higher than the 2.77% prevalence recorded in a study at the Bolgatanga Municipal Abattoir as reported by Atawalna *et al.*,2016.

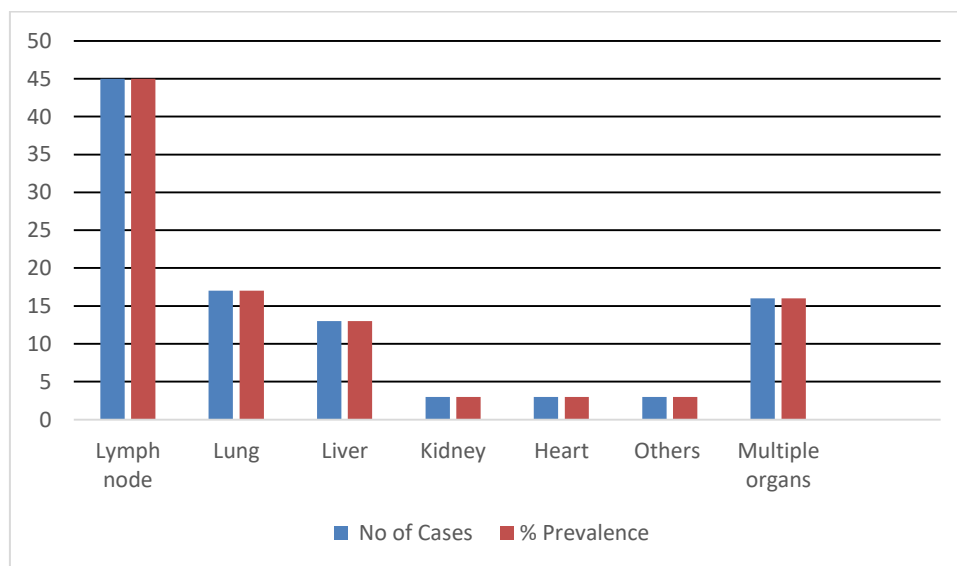
This difference may be due to the origin of cattle slaughtered at both abattoirs. Majority of the cattle slaughtered at the Bolgatanga Municipal abattoir are likely to originate from within the Upper East region. On the other hand cattle at KACL originated from Northern Ghana as well as neighbouring countries such as Mali, Niger and Burkina (Frimpong *et al.*, 2014). The disease burden of these foreign animals may be on the higher side accounting for the higher prevalence rate.

**Table 1: Monthly Distribution of Cases of Abscessation.**

MONTH	NUMBER EXAMINED	NUMBER AFFECTED	PREVALENCE (%)
OCTOBER	295	19	6.44
NOVEMBER	210	17	8.10
DECEMBER	149	6	4.03
JANUARY	241	25	10.37
FEBRUARY	184	11	5.98
MARCH	189	6	3.17
<b>TOTAL</b>	<b>1268</b>	<b>84</b>	<b>6.62</b>

$X^2 = 10.85$   $P > 0.05$

Abscessation was higher in male cattle (52%) than in females (48%). Abscessations occurred more frequently in lymph nodes (45%), followed by lungs only (17%) and least in the heart, kidney and other organs (3%)(Figure 1). Multiple organ abscessations (16%) were found mainly in the lungs, liver and lymph nodes. This is due to the role of lymph nodes in filtering blood and producing leukocytes to fight against antigens of microorganisms.



**Figure 1: Prevalence of Abscesses by Organ Type**

Alembrhan and Haylegebriel (2013) in a study conducted at the Adigrat municipal abattoir, northern Ethiopia, recorded a prevalence of 0.46% abscesses in the kidney, lung and liver which is very low compared to the 32.15% recorded in the kidney, lung and liver in this study.

The prevalence of abscessations in liver and lung in this study was 29.77% which is higher compared to the study conducted by Yifat *et al.*, (2011) at the Gondar Elfora Abattoir, Northern Ethiopia.

This study isolated microbes from 19 samples (67.9 %) samples cultured on standard nutrient media and *Mycobacterium Spp* from 9 samples which grew on MacConkey agar, nutrient agar and blood agar.

Microorganisms identified in this study included: *Staphylococcus spp*(27.9%), *Escheria coli*(14.9%), *Streptococcus spp*(19.1%), *Proteus spp*(10.6%), non- lactose fermenting organisms (8.5%) and *Mycobacterium spp*(19.2%) respectively (Table 2).

**Table 2: Frequency of isolation of Bacteria from Abscesses**

<b>Bacteria Spp</b>	<b>Frequency</b>	<b>%</b>
Staphylococcus	13	27.7
E.coli	7	14.9
Streptococcus	9	19.1
Proteus	5	10.6
*NLFO	4	8.5
Mycobacterium	9	19.2
<b>TOTAL</b>	<b>47</b>	<b>100</b>

\*NLFO- Non lactose fermenting organism

These findings are similar to that reported by Tavassoli *et al.*, 2010, from subcutaneous abscesses in cattle in Northern Iran. *Staphylococcus spp*, *Escheria coli* and *Streptococcus spp* have previously been isolated from liver abscesses in Herrik sheep in Iran ( Tehrani *et al.*, 2012).

*Mycobacterium Spp* was isolated in carcasses with multiple organ abscessations in 19.2 % cases. These cases were not having typical tuberculous lesions. Adu-Bobi *et al.*, 2009, reported that 73.1% of slaughtered cattle with suspected tuberculous lesions in this abattoir were positive for acid fast bacilli. It is therefore possible that cattle with asymptomatic tuberculosis may be missed at post mortem inspection alone. This finding is lower than 25.2% positive samples from cattle with suspected tuberculous lesions as diagnosed by the Ziel-Neelsons test in Bauchi state, Nigeria (Saidu *et al.*, 2015).

Cvetkovikj *et al.*, 2017, demonstrated that mycobacterium can be detected in animals with visible tuberculous lesions (82.2%) as well as those without

visible lesions ( 27.7%) , using microbiological and molecular techniques. It is therefore not enough to rely on only gross lesions of tuberculosis before passing carcasses as wholesome for human consumption.

## CONCLUSION

- Organ abscessation in slaughtered cattle at the Kumasi abattoir is very high.
- Different microorganisms were associated with organ abscessation.
- *Mycobacterium Spp* was responsible for causing multiple organ abscessations .

## 5.2 RECOMMENDATION

Carcasses with multiple organ abscessations should be examined for *Mycobacterium spp*. before being passed as wholesome for human consumption. Further work has to be done to determine the antibiotic sensitivity of the microorganisms causing abscessation in cattle.

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