

INVESTIGATION OF CAUSES OF CONDEMNATION OF BOVINE  
ORGAN AND CARCASSES IN MURANGA COUNTY IN KENYA

BY

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## DECLARATION

I hereby declare that this research project publication submitted for my bachelor of veterinary medicine degree in the University of Nairobi is my own work and has not been submitted to any other university or higher education institution

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J30/3474/2009

Sign .....

date .....

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## **Dedication**

This study is dedicated to my parents

Father George muritu for his support love and encouragement while pursuing this prestigious degree.

Mother Margaret wanjiru for her fruitful prayers wisdom encouragement and support.

Brother and sister joseph kimani and kezynjeri for their continued support and encouragement and faith in me

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## **Abstract**

This study was done to investigate the causes of carcass condemnation in 2 abattoirs .Condemnation of carcasses as a result of animal diseases and conditions has been identified as a problem in the Kenyan beef industry .The importance of cattle management during transportation and preslaughter is appreciated but a better understanding on handling and management of cattle before and during slaughter can help improve slaughter management in abattoirs .

Diseases and conditions evaluated during this study were bruising, soiling, fever, peritonitis, pleuritis, abscesses, oedema, intramuscular hemorrhages, fasciolosis, hydatidosis, emphysema.

Breeds of cattle slaughtered were freshians, jersey, guernsey, and indigenous zebu breed.

Data collected was from 2 slaughter houses ;kabati and muranga from January 2013 to January 2015 a period of 2 years .

Overall significant findings of causes of bovine carcass condemnation evaluated in these 2 abattoirs during period of study were ;fasciolosis 58.2% and hydatidosis 37.6 % for liver, hydatid disease 55.7% and emphysema 7.62% for lungs ,pericarditis 24.32% and hydatid cysts 20% for heart, calcification 21.34% for kidneys and hydatidosis 72.2% for spleen.

No whole bovine carcass was condemned but evidence of trimming of undesired parts of carcass was noted mainly due to injuries .

Rate of condemnation due to parasitic causes was higher in the liver than in the lungs .Parasitic diseases especially fasciolosis and hydatidosis were a major cause of organ condemnation .The current results shows that a thorough investigation that leads to disease prevention and control strategy is required.

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# **Chapter1**

## **1.0 aims and objectives**

aim of study was to investigate causes of condemnation of bovine organ and carcasses in slaughter houses in murangacounty.In doing so we;  
identified managerial factors affecting condemnation of bovine carcasses  
identified different diseases and conditions leading to condemnation of carcasses

## **1.1 problem statement**

Condemnation of bovine carcasses as result of animal diseases and conditions has been a problem in the Kenyan beef industry.the importance of cattle slaughter management is generally appreciated but a better understanding of the major diseases leading to the condemnation of bovine organ and carcasses aid in improving slaughter management in slaughter houses

## **1.2 justification and motivation of study**

in order reduce carcass condemnation proper managerial skills regarding cattle production and cattle slaughter should be applied .In the homesteads farmers should be taught on improved small-holder farming systems and be guided in seeking veterinary assistance in their production systems to combat diseases in their cattle. In the slaughter houses experienced personnel should be employed and trained properly on how to handle animals ante-mortem and postmortem .Well trained veterinarians or meat inspectors should be employed at slaughter houses to identify different conditions or diseases present in cattle that are slaughtered .Improvements in management of cattle production and cattle slaughter process will ensure acceptable and safe meat for human consumption.

## **CHAPTER 2**

### **Literature review**

#### **2.1**

#### **Introduction**

In the last 30 years ,the world average annual meat production has risen by 4.0 % with beef production rising by 3.4 %.The rate of growth of meat production in developing countries was much lower and this low growth of meat and beef production was due to an increase in the number of animals [smith 1973].

Cattle are either produced intensively in feedlots ,extensively in pastures or locally by pastoralists who graze their cattle all round looking for available pastures influenced by seasonal changes .Dietary effects of animal feeds on carcass and meat quality of cattle has been intensively researched .Studies on varying dietary levels [Prior, Kohl-Meier, Cundiff ,Dikeman and Crouse 1977, Crouse ,Anderson and Neumann 1978] as well as grain vs forage based diets [Bowling, Smith, Carpenter, Dutson and Oliver 1977, Young and Kauffman 1978, Schroeder, Gramer ,Bowling and Cook 1980, Crouse et al 1978] have appeared in literature .

In general, carcasses from feed-lot fed cattle are heavier and contain more fat than carcasses from forage fed cattle .Beef from forage fed cattle is also darker and less tender than that from feedlot cattle [Bowling et al 1977]. Most of the studies mentioned herein have been conducted in the United States Of America where consumers prefer heavier carcasses .In Kenya specifically Muranga county ,consumers prefer lean meat with little visible fat .Carcasses are produced to fit consumers preferences and are seldom trimmed off excess fat .With intensive livestock production ,there is a strong move towards producing animals in fully controlled environments and to feed and raise more cattle in feed-lots to allow for more better disease management and control.[Hoffman and Mellet 2005]

## **2.2 Safe transportation of animals to the slaughter houses**

All animals should be transported in vehicles or containers that are properly designed and maintained to ensure they do not cause injury or sickness to the animal. Animal transportation vehicles should be designed so that ;

There is enough height for animals to stand up in a natural position without touching the roof and with adequate spacing between adjacent animals

Floor should be constructed of non slip material or evenly covered with straw for secure footing.

No part of the animal should protrude from the vehicle

Sufficient air flow and ventilation

The vehicle should be cleaned and sanitized prior to loading to prevent spread of disease from previous loads and reduce risk of contamination from debris, dirt, deposited into vehicle from previous loads [Grandin,1989]

## **2.3 Unloading of animals**

Animals should be unloaded as soon as possible upon arrival at the slaughter house .

To facilitate humane handling and minimize chances of animal being injured during unloading ,the slaughter house should;

Provide immediate shelter for all animals arriving for slaughter

Accommodate safe unloading of different species of animals of variable ages and weights

Provide separate space for animals that are injured during transportation

Ensure injured animals are handled with care to prevent further injury

Ensure that after unloading sick animals are segregated from other animals [Grandin 1989].

## **2.4 The slaughter house**

Also known as an abattoir .It is a place where animals are slaughtered or intend to be slaughtered. This includes areas adjacent to such facilities where carcasses are chilled or meat and animal products handled.[ Meat safety act]

## **2.5 Ante-mortem inspections at the slaughter houses**

To obtain maximum benefit during slaughter ,a properly conducted inspection is essential .It is the abattoirs management responsibility to ensure that only those animals that have received ante-mortem inspection as required under the regulations act are supposed to proceed to the slaughter floor.

Ante-mortem inspection serves to;

Identify animals that show clear evidence of being infected with a disease or condition that could render a carcass unfit for human consumption.

Separating infected animals and slaughtering them separately.

Identifying animals that are suspected of having chemical residues after being treated with veterinary drugs .

Identify animals which could pose a threat to the health of personnel handling the carcass.

Identify heavily contaminated animals.

Identify animals suspected of having a reportable disease.

Making a disposition regarding suitability of animals for slaughter.[clark,1993]

## **2.6 Pre-slaughtering procedures at the slaughter house**

Meat inspection regulations require that animals not to be held in a pen for more than 24 hours without adequate feeding ,watering and bedding and so water should be accessible to the animals at all times. Feed and water withdrawal should be kept to a minimum and be consistent with good processing practices.Extended periods without food and water may have a negative impact on quality of meat produced by an animal [Grandin 1989]

## **2.7 Animal slaughter process**

Slaughtering process is defined as killing of an animal in order to obtain meat or animal products [Bekker,1998].

Sequence of animal slaughter operations ;

Offloading

Ante-mortem inspection

Liairaging

Stunning and hosting

Bleeding

Head, hide and hoof removal

Evisceration

Halving the carcass

Carcass inspection

Final trimming

Carcass washing

Classification

Chilling

Dispatch

Livestock slaughtering operations done under direct supervision of a qualified veterinary doctor and in accordance with Islamic shariah. All slaughter operations lie under direct supervision of a qualified veterinary doctor to ensure that all animals delivered to the slaughter house are inspected before and after slaughter. Abattoirs have hygienic programmes to ensure efficient control over slaughter operation procedures such as; slaughter halls, tools and equipments are always kept clean , sanitized and disinfected

## **2.8 methods used for killing and bleeding animals**

Sterilization of knives at 82 degrees celsius in between cuts of different animals. Method used was stunning of the animal with a stunning gun. Other methods used are ;hold slaughter without stunning, captive bolts stunning with sticking.

## **2.9 Animal skinning and deheading**

Machines and knives are used for skinning and deheading thus the skin and head are completely removed by trained personnel to avoid damaging the carcass or contaminating the meat.

## **3.0 Carcass condemnation**

### **[I] Prevention of carcass condemnation**

Prevention of drug residues and injection site lesions should be implemented by ensuring proper administration and observance of meat withdrawal periods for all animal health products. The following guidelines should also be taken into account;

Do not market treated animals before drug withdrawal period for meat has expired

Do not market significantly lame cattle

Do not market animals that are emaciated

Cull disabled cattle and those with advanced terminal conditions

Market animals with physical disorders in a timely way to avoid condemnations.

## **[II] Prevention of carcass bruising**

In order to prevent bruising the following should be done and adhered to;

Dehorn cattle at an early stage

Correct deficiencies in facilities and transportation equipment

Use of proper handling techniques when handling animals

## **[III] Animal hide damage**

The following should be adhered to avoid hide damage ;

Use of ecto-parasites to control external parasites of animals

Use proper identification methods to avoid hide damage

Proper handling of animals

### **3.1 Inspection of carcasses at the slaughter house**

This is done to identify abnormalities and to condemn carcasses which are unfit for human consumption .Fit carcasses are normally marked with stamps to indicate approval from the meat inspector .Conditions considered during postmortem inspections of cattle carcasses in Kenya are as follows ;

Table 1.2 conditions considered during routine inspection of bovine carcasses in Kenya

Carcass	abscess
	Icterus
Omphalophlebitis	
	Arthritis
	Tuberculosis
	Measles
	Bruising
	Emaciation
Oedema	
	Soiling
	Fever
Septicaemia	
	Gangrene
	Lymphadenitis
	Melanoma
Parafilaria	
Pleuritis	
	Peritonitis
Pyemia	
The head	
	Abscesses
	Tuberculosis
	Soiling
Actinomycosis	

The limbs

Bruising

Arthritis

Abscesses

The lungs

Emphysema

Tuberculosis

Cysts

Rumen content aspirations

Melanosis

Abscesses

Pneumonia

Pleuritis

The heart

Pericarditis

Epicarditis

The liver

Abscesses

Fasciolae

Telangiectasis

Spleen

Infarcts

Splenomegaly

The kidneys

Nephritis

Hydronephrosis

The stomach

Peritonitis

Ulcers

The intestines

Tuberculosis

Enteritis

Peritonitis

Tenuicoillitis

## **3.2 Animal diseases that cause carcass condemnations**

### **[I] Bovine respiratory diseases**

Studies show that 60% of disease associated losses in feedlots are due to respiratory disease complex. Many causes of sudden death syndromes are actually attributed to pneumonia that is easily diagnosed when a postmortem is performed. Lung infections due to respiratory diseases cause major lung condemnations at slaughterhouses.

Bovine respiratory disease complex is caused by a complex interaction of animal, environmental and stress factors. Stress is often a result of changing conditions which can be either change in diet, environment, fatigue, pain, fear, confinement, heat [Faber, Hartwig, Busby, Bredahl, 1999]

Major bacterial pathogens include; *Pasteurella hemolytica*

*Pasteurella multocida*

*Haemophilus somnus*

### **[II] Brucellosis**

Contact with animals identified as having this particular disease is dangerous as they are of a zoonotic risk.

### **[III] Tuberculosis**

Granulomatous and any tuberculous like lesions found anywhere in bovine carcass should be forwarded for laboratory analysis.

### **[IV] Trichinosis**

In case of animal discovered infected with trichinosis, infected carcasses should be confined and condemned after laboratory confirmation.

### **[v] fasciolosis**

Infection of the liver with either *fasciolagigantica* or *fasciola hepatica*. On cutting of the liver cross sectionally during meat inspection these organisms are observed in the liver.

The above diseases are some of those diagnosed in the slaughter house that can lead to carcass condemnation

## **3.3 ways to minimize cases of carcass condemnation**

Successful treatment of diseases in cattle involves recognition of sick animals, diagnosing and appropriate therapy done. Conducting follow-up checks and proper record keeping.

Treatment of internal and external parasites should be routinely done and maintained

Castration and dehorning should be carried out routinely

Personal hygiene when slaughtering and handling carcasses

Equipment used for slaughter should be clean and sterile

People suffering from contagious diseases should not work in a slaughterhouse where edible products are handled, [Maja et al, 2007]

## **Chapter 3 Materials and methods**

### **3.1 Study area**

Study was conducted to investigate causes of carcass condemnation in muranga county . I identified 2 abattoirs as the most suitable places to conduct my research ; muranga slaughter house and kabati slaughter house.

### **3.2 Study design**

I used information from past records of condemnation of carcasses from the slaughter houses and I also got a chance to conduct investigations practically for the last one month of my research project . I collected data from the slaughter house on records dating from January 2013 to January 2015 . The last month of December 2014i was able to observe the operations and get first hand experience , observation and information in the slaughter house .

### **3.3 Data analysis**

Data analysis was done by getting the percentage of the attributes that were collected when collecting data .Different organs were condemned for different reasons . Analysis was done by analyzing organs condemned over the total number of condemnations to get the percentages and analyzing reasons for condemnation of a particular organ over the total particular organ condemnations to get the percentages.

### 3.4 Results

A total of 537 condemnations of different organs was done in the period January 2013 to January 2015 . No whole bovine carcass was condemned during this period . Percentages of organs condemned was as follows ;liver51.0 %, lungs 22.9%, spleen 7%, muscle areas 6.0% , kidneys 4.8% , heart 3.9%

Table ; Results of causes of condemnation of organs and carcasses

Organ	Number condemned	%	reasons for condemnation	number	%
Liver	274	51	fasciolosis	159	58.2
			Hydatidosis	103	37.6
			Abscess	12	4.4
Lung	123	22.9	pneumonia	40	32.5
Hydatid cysts	36	29.3	Tuberculosis	31	25.2
			Abscess	11	9.0
			Emphysema	5	4.0
			Spleen	41	7
			Unknown reasons	11	26.8
Muscles	32	6	oedema	15	46.9
			Intramuscular hemorrhage	7	21.9
			Abscess	5	15
			Trauma	5	15
Kidneys	26	4.8	hydatid cysts	15	57.7
			Calcification	11	42.3
Heart	21	3.9	hydatid cysts	15	71.4
			Pericarditis	6	28.6

### **3.5 Discussion**

From the results livers and lungs were the most condemned organs .this confirms investigations and reports from others even in Other countries [ MallauBl,et al]. The main condemnations in liver were due to fasciolosis and hydatidosis which is also evident in other studies [phiri Am Js et al ]. The main reason for condemnation in the lungs was due to pneumonia ,hydatid cysts and tuberculosis but also abscesses and emphysema contributed tothe condemnations. Spleen condemnation was mainly due to hydatidosis . Muscles were partially trimmed or wholly cut and condemned due to mostly oedema where by these muscle areas had layers that were waterly due to excessive accumulation of fluids in the intercellular spaces and body cavities . Intramuscular hemorrhages were also a reason for condemnation of muscles and were observed as blood clots in the deeper muscle layers. Abscesses and trauma were the least cause of muscle condemnation. In the kidneys hydatid cysts and calcification were the reasons why most of the kidneys were condemned .The least condemned organ was the heart and it was due to presence of of cysts and pericarditis .No whole bovine carcass was condemned and no records of tongue or head condemnation was observed during this study .

### **3.6 Conclusion**

Bovine organ and carcass condemnation investigations need to thoroughly done so that solutions that help in reducing the condemnations can be found. The financial impact of organs condemned during this study was significant and deprived livestock farmers the much needed revenue and consumers of protein source .Much or all of the condemned material that could have been useful was wasted by not being retrieved for conversion to processed meat or pet food .Failure to detect lesions of zoonotic diseases at slaughter poses a health risk to consumers.

### **3.7 Recommendation**

Based on the results of this study ,it suggested that regular deworming of cattle needs to be done to minimize the rate of organ condemnations. Proper handling techniques should be applied to animals to avoid injuries which may lead to oedema and intramuscular hemorrhages . Proper treatment of animals by qualified animal health personnel should be done timely and withdrawal periods for meats of such animals adhered to .To avoid animals fighting, those not reared together must not be mixed during transportation and trucks should not overload animals. Livestock vaccination is also an important routine management programme and thus inspection and condemnation of bovine carcasses require more attention in Kenya.

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