

## Condemned Meat and Offal from Different Slaughtered Animals at Two Different Environments

Ali Meawad Ahmad\* and Nagwa T Elsharawy

Department of Food Hygiene, Faculty of Veterinary Medicine, Suez Canal University, Assuit University New Valley Branch, Egypt

\*Corresponding author: Ali Meawad Ahmad, Department of Food Hygiene, Faculty of Veterinary Medicine, Suez Canal University, Assuit University New Valley Branch, Egypt, E-mail: ameawad@yahoo.com

Received date: January 04, 2018; Accepted date: February 18, 2018; Published date: February 23, 2018

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### Abstract

**Objective:** Study conducted to evaluate the meat, liver and kidney condemnation of sheep, cattle, and camel around 2017 slaughtered animals between upper and lower Egypt "Ismailia and Elkharga slaughterhouses".

**Methods:** The prevalence of the gross lesions of meat, liver and kidney was collected all over the examined time of the study for detection of abnormalities at ante-mortem and post-mortem inspections.

**Results:** Ismailia slaughterhouse recorded about; 9788 slaughtered animal as following; (1890 (19.3%) sheep, 7652 (78.2%) cattle, 246 (2.5%) camel) while in Elkharga slaughterhouse recorded about; 2299 slaughtered animal as following; (32 (1.39%) sheep, 2251 (97.92%) cattle, 16 (0.69%) camel). Results revealed that beef was 1377360 Kg (93.0%) the first selection by Ismailia population followed by chevon (56700 Kg) 3.8% then camel meat (46740 Kg) 3.2%. While, in New valley beef were the highest consumed 405180 kg (99.02%), followed by camel meat 3040 (0.75%) then chevon 960 kg (0.23%). The total condemned meat from sheep, cattle, and camel were 134 (8.7%), 1350 (87.7%) and 56 (3.6%) Kg respectively. While, about 1449 kg of meat was condemned at Elkharga slaughterhouse as following; 21 (1.45%), 1391 (95.99%) and 37 (2.56%) from sheep, cattle, and camels respectively. Gross liver lesions in sheep, cattle, and camel were 18 (7.9%), 197 (86.4%) and 13 (5.7%) lesions respectively at Ismailia slaughterhouse. Gross kidney lesions of sheep, cattle and camel were 2 (4.0%), 48 (96.0%) and 0 (0.0%) lesions respectively. On the other hands, the gross liver lesion recorded at Elkharga slaughterhouse was about 1 (2.7%), 36 (97.29%) and 0 (0.0%) of sheep, cattle, and camels respectively. While the kidney gross lesions were 0 (0.0%) for sheep and camel and 7 (100%) for cattle carcasses.

**Conclusion:** Study recorded lower incidence of condemnation in Elkharga than Ismailia carcasses due to sunny, hot weather and dry environment that inhibit almost causative agents.

**Keywords:** Abscesses; Condemned meat; Sheep; Cattle; Camel; Gross lesions; Liver; Kidney

### Introduction

Meat is the most delicious, nutritious, flavorful and palatable food. It constitutes a valuable part of the human diet because of its high content of first class proteins and other nutrients as minerals. In the past, the major objective of research on meat-producing ruminants was to increase meat production with low costs of production. Nowadays, the meat safety crisis and the unreliability of meat eating quality have increased the concern of consumers for the natural feeding of the animals, human health, and high-quality beef [1-2].

The use of cattle for both milk and meat production is widespread. Methods used for grading carcasses evaluation of cattle are according to meat quality [3]. Most of the sheep breeds are multipurpose producing lambs, wool and milk [4]. Sheep meat represents 3% of the world's meat market and its importance has decreased during the last 20 years as a consequence of the greater relative growth of other meats [5]. Sheep meat is smoother, juicier and more flavors. The fat amount in the animal carcass, the diet applied and its slaughter weight influenced sensorial attributes. Camel meat is healthy and nutritious as it contains low fat as well as being a good source of minerals [6].

Liver and kidney are edible offal, which defined as animal products. Offal contributes to achieve the enjoyment of food with unique flavors, textures, and aromas and contributes high vitamins contents, Offal particularly liver, are employed in a large number of dishes or as common ingredients in baby foods or restoratives in many countries. However, the liver may form a valuable guide as to the presence of toxic changes may be manifested by cloudy swelling or at the later stage, by pathological fatty changes. Liver is commonly affected by various affections e.g. telangiectasia, abscess, focal necrosis, fascioliasis, cirrhosis as well as parasitic diseases e.g. fascioliasis and hydatid disease [7].

Incidence and histopathology of interstitial nephritis of affected kidney samples were examined. Diffuse interstitial nephritis was observed. Grossly, the kidneys were enlarged with red and gray mottling. Focal interstitial nephritis was observed. Grossly, the kidneys showed grayish-white nodules [8].

Post-mortem inspection involves palpation of tissue and organs, incisions where necessary, use of the inspector's sense of smell and if indicated laboratory tests [7].

Although meat, liver and kidney considered of the most favorable dishes but it may play a role in spreading in a lot of diseases that's make the routine post-mortem examination should be carried out as soon as

possible after carcass dressing is completed. There is shortage of cooperation and analysis of slaughterhouses data around Egypt governorates. Therefore, this study was conducted to evaluate the meat, liver and kidney lesions in slaughtered animals at Ismailia and Elkharga slaughterhouses and their effect on meat quality.

## Materials and Methods

**Study area:** The study performed between two abattoirs one in the western north part of Egypt in Ismailia city and the second one in the opposite part of Egypt (eastern south part of Egypt) Elkharga abattoir in New Valley Governorate. Ismailia is a city in north-east Egypt, and is the capital of the Ismailia Governorate. It has a population approximately 750,000. The main abattoir of Ismailia city is present in Abo-Khalifa district. While, the New Valley is a part of the oasis which is located to the west of the Nile Valley. New Valley Governorate located 232 km to the South of Cairo and represented about 45% from the total Egypt area. The second part of this study was conducted in the municipal slaughterhouse in Elkharga city, which is the capital of New Valley Governorate.

**Animals under study:** The surveillance performed around 2017 slaughtered animals in Abo-Khalifa district, which were; about 9788 slaughter animals (1890 sheep, 7652 cattle and 246 camels) were slaughtered and inspected during year 2017. While, Elkharga slaughterhouse slaughtered animals during 2017 were; about 2299

slaughtered animals (32 sheep, 2251 cattle, 16 camels) were slaughtered and inspected during year 2017. The prevalence of the gross lesions of liver and kidney was collected all over the examined time of the study.

**Determination of abnormal conditions:** The records of animals slaughtered and the organ lesion(s) observed and condemned were noted. All animals presented for slaughter were observed shortly a day before slaughter when the animal at rest for easily detection of any signs of disease. Procedure adopted for detection of abnormalities at ante-mortem and post-mortem inspections were according to Egyptian Guidelines for Inspection of Cattle [7]. Thoroughly visual post-mortem carcasses and organs inspection special attention on livers, kidney and meat.

## Results and Discussion

Slaughterhouses provided an excellent opportunity for detecting diseases of both economic and public health importance [9]. Many surveys conducted to investigate macroscopic and microscopic abnormalities of any pathological conditions have been performed in different countries abattoir [10].

The absolute number, meat weights (kg) and total condemned meat from the slaughtered animal at Ismailia and Elkharga slaughterhouses during 2017 shown in the table 1.

Animal	Ismailia Abattoir			Elkharga Abattoir		
	Live Animal	Meat (Kg)	*C. Meat (Kg)	Live Animal	Meat (Kg)	*C. Meat (Kg)
Sheep	1890 (19.3%)	56700 (3.8%)	134 (8.7%)	32 (1.39%)	960 (0.23 %)	21 (1.45%)
Cattle	7652 (78.2%)	1377360 (93.0%)	1350 (87.7%)	2251 (97.92%)	405180 (99.02%)	1391 (95.99%)
Camel	246 (2.5%)	46740 (3.2%)	56 (3.6%)	16 (0.69%)	3040 (0.75%)	37 (2.56%)
<b>Total</b>	<b>9788 (100%)</b>	<b>1480800 (100%)</b>	<b>1540 (100%)</b>	<b>2299 (100%)</b>	<b>409180 (100%)</b>	<b>1449 (100%)</b>

**Table 1:** Absolute Numbers & Percentage of Slaughtered Animals at Ismailia and Elkharga Slaughterhouses. \*C. Meat (Kg) means condemned meat

During this period, Ismailia slaughterhouse recorded about; 9788 animal was slaughtered and inspected during the survey as following; (1890 (19.3%) sheep, 7652 (78.2%) cattle, 246 (2.5%) camel) while in Elkharga slaughterhouse recorded about; 2299 animal was slaughtered and inspected during the survey as following; (32 (1.39%) sheep, 2251 (97.92%) cattle, 16 (0.69%) camel) were slaughtered and their records formed a source of data for the current study.

The absolute total meat weights (Kg) obtained from sheep, cattle, and camel all over the year 2017 in Ismailia slaughterhouse were 1480800 Kg. The obtained results clearly revealed that cattle meat during year 2017 was 1377360 Kg (93.0%) and considered the first selection by Ismailia population because of their palatability and flavor. The second meat of choice was sheep meat (56700 Kg) 3.8% followed by camel (46740 Kg) 3.2%. While, the absolute total meat weights (Kg) obtained from sheep, cattle, and camel all over year 2017 in Elkharga slaughterhouse were; 409180 kg. as following; the highest consumed types of meat were beef 405180 kg (99.02%), followed by camel meat 3040 (0.75%) then sheep meat 960 kg (0.23%).

The condition of slaughtered animal health is the main parameter, which is impact on the quality of meat and edible offals. In compliance

with current Egyptian Guidelines for Inspection of cattle Egyptian Law 517, 1986, all slaughtered animals presented for human consumption must satisfy two fundamental requirements: they must be free from conditions, which might adversely affect human or animal health, and their welfare must not be compromised at any stage from the farm to the moment of slaughter.

Animal	Ismailia Abattoir		Elkharga Abattoir	
	Liver	Kidney	Liver	Kidney
Sheep	18 (7.9%)	02 (4.00%)	01 (2.70%)	00 (00.0%)
Cattle	197 (86.4%)	48 (96.0%)	36 (97.29%)	07 (100%)
Camel	13 (5.7%)	00 (0.00%)	00 (0.00%)	00 (00.0%)
<b>Total</b>	<b>228 (100%)</b>	<b>50 (100%)</b>	<b>37 (100%)</b>	<b>07 (100%)</b>

**Table 2:** Absolute Numbers & Percentage of Liver and Kidney Lesions for Slaughtered Animals at Ismailia and Elkharga Slaughterhouses

A total of 1540 kg condemned meat was obtained from the slaughtered animal at Ismailia slaughterhouse during the year 2017. The total kilograms of condemned meat from sheep, cattle, and camel were 134 (8.7%), 1350 (87.7%) and 56 (3.6%) Kg respectively. On the other hand, about 1449 kg of meat was condemned at Elkharga slaughterhouse as following; 21 (1.45%), 1391 (95.995) and 37 (2.56%) from sheep, cattle, and camels respectively. Abattoir is considered as the biggest laboratory on the earth. The slaughterhouse and its regulations represent a key control point of livestock production chain [11,12]. Results of meat inspection of slaughter animal are too important for animal health control system [13].

The total numbers recorded of gross liver and kidney lesions of the slaughtered animal at Ismailia slaughterhouse were 228 and 50 lesions respectively while in case of Elkharga slaughterhouse were 37 and 7 respectively (table 2).

Gross liver lesions in sheep, cattle, and camel were 18 (7.9%), 197 (86.4%) and 13 (5.7%) lesions respectively at Ismailia slaughterhouse. Gross kidney lesions of sheep, cattle and camel were 2 (4.0%), 48 (96.0%) and 0 (0.0%) lesions respectively. On the other hands, the gross liver lesion recorded at Elkharga slaughterhouse was about 1 (2.7%), 36 (97.29%) and 0 (0.0%) of sheep, cattle, and camels respectively. While the kidney gross lesions were 0 (0.0%) for sheep and camel and 7 (100%) for cattle carcasses. A veterinarian usually

uses his knowledge bases and diagnostic skills at slaughter [14]. Meat abnormalities constitute a serious and major problem as well as for breeders than for veterinarians, because of the major economic losses they cause, and the expenses of the care and preventions that they generate.

The result obtained in table 3 and figures 1 and 2 shown the incidence rate of various kinds of liver abnormalities in animal slaughtered at Ismailia city slaughterhouse as following; the total liver lesions were; 228, 18 (7.9%) lesions in sheep, 197 (86.4%) lesions in cattle and 13 (5.7%) lesions in camel of the 228 liver lesions about 6 (2.63%), 133 (58.3%) and 7 (3.07%) were abscesses in sheep, cattle and camel respectively. While out of 228 liver lesion liver cirrhosis were; 2 (0.88%), 17 (7.46%) and 0 (00%) in sheep, cattle, and camel respectively and other liver lesions were 10 (4.39%), 47 (20.6%) and 6 (2.63%) in sheep, cattle and camel respectively. table 3 also shown the incidence rate of various kinds of liver abnormalities in animal slaughtered at Elkharga city slaughterhouse as following; the total liver lesions were; 37, 1 (2.7%) lesions in sheep, 36 (97.3%) lesions in cattle and 0 (00%) lesions in camel of the 37 liver lesions about 0 (00%) in sheep and camel and 17 (45.95%) in cattle were abscesses. While out of 37 liver lesion liver cirrhosis were; 0 (00%) in sheep and camel and about 8 (21.62%) in cattle and other liver lesions were 1 (2.7%), 11 (29.73%) and 0 (00%) in sheep, cattle, and camel respectively.

Lesion		Ismailia Abattoir			Elkharga Abattoir		
		Sheep	Cattle	Camel	Sheep	Cattle	Camel
Liver Lesions	Abscesses	06 (2.63%)	133 (58.3%)	7 (3.07%)	00 (0.00%)	17 (45.95%)	00 (0.00%)
	Cirrhosis	02 (0.88%)	17 (7.46%)	0 (0.00%)	00 (0.00%)	08 (21.62%)	00 (0.00%)
	Other	10 (4.39%)	47 (20.6%)	6 (2.63%)	01 (2.70%)	11 (29.73%)	00 (0.00%)
	<b>Total</b>	<b>18/228 (7.90%)</b>	<b>197/228 (86.4%)</b>	<b>13/228 (5.7%)</b>	<b>01/37 (2.70%)</b>	<b>36/37 (97.30%)</b>	<b>00/37 (0.00%)</b>
Kidney Lesions	Hydronephrosis	02 (4.00%)	30 (60.0%)	00 (0.00%)	00 (0.00%)	01 (14.29%)	00 (0.00%)
	Pyelonephritis	00 (0.00%)	08 (16.0%)	00 (0.00%)	00 (0.00%)	05 (71.42%)	00 (0.00%)
	Other	00 (0.00%)	10 (20.0%)	00 (0.00%)	00 (0.00%)	01 (14.29%)	00 (0.00%)
	<b>Total</b>	<b>02/50 (4.00%)</b>	<b>48/50 (96.0%)</b>	<b>00/50 (0.00%)</b>	<b>00/07 (0.00%)</b>	<b>07/07 (100%)</b>	<b>00/07 (0.00%)</b>

**Table 3:** Incidence Rate of Liver and Kidney Lesions for Slaughtered Animals at Ismailia

Local liver suppurative lesions cause significant losses especially in the cattle carcasses, the aggressive grain-feeding of cattle can also cause liver abscesses which leading to a major economic impact due to reduced animal performance, carcass yield and liver condemnation [15].

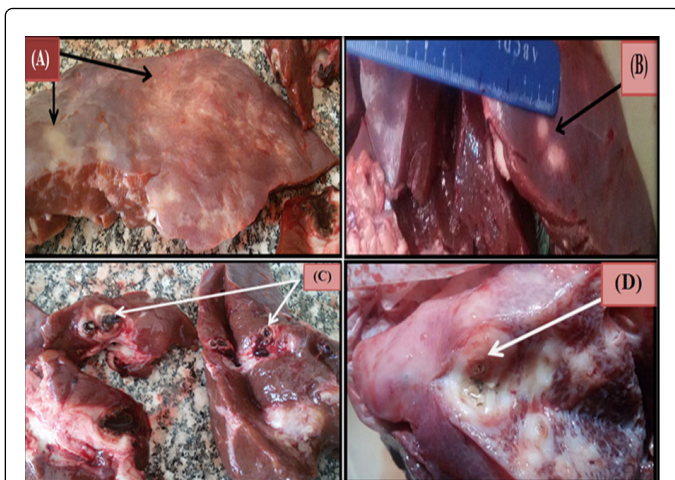
The main causes of condemnation of livers in slaughterhouses were telangiectasis and abscesses. Macroscopic hepatic lesions were recorded from cattle slaughtered and showed hepatic alterations or lesions. Telangiectasis, abscesses, gastrointestinal contamination, hepatic congestion, perihepatitis, cirrhosis, steatosis, hepatitis, hydatidosis, fasciolosis, and tuberculosis are the most liver lesions detected inside the abattoir [16].

The result obtained in table 3 and figures 1 and 2 shown the incidence rate of various kinds of kidney abnormalities in animal slaughtered at Ismailia city slaughterhouse as following; the total kidney lesions were; 50, 2 (4.0%) lesions in sheep, 48 (96.0%) lesions in

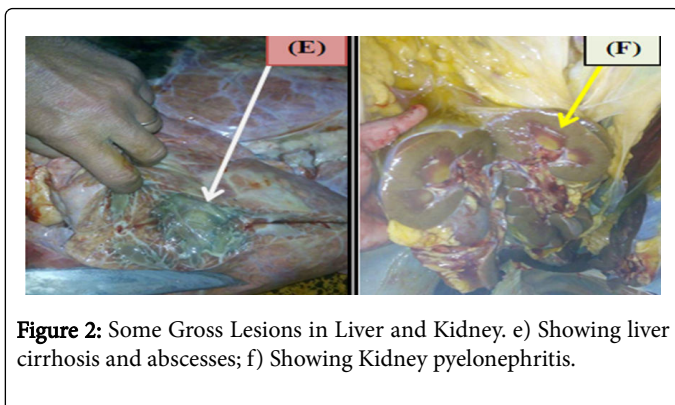
cattle and 0 (00%) lesions in camel of the 50 kidney lesions about 2 (4.0%), 30 (60.0%) and 0 (00%) were hydronephrosis in sheep, cattle and camel respectively. While out of 50 kidney lesion, pyelonephritis was; 0 (00%) in sheep and camel and were 8 (16.0%) in cattle and other kidney lesions were 0 (00%) in sheep and camel and about 10 (20.0%) in cattle.

Table 3 also shown the incidence rate of various kinds of kidney abnormalities in animal slaughtered at Elkharga city slaughterhouse as following; the total kidney lesions were; 7, 0 (00%) lesions in sheep and camel and about 7 (100%) in cattle of the 7 cattle kidney lesions about 1 (14.29%) has hydronephrosis and equal % were had other kidney lesions while pyelonephritis lesion was about; 5 (71.42%).

Macroscopical lesions of kidney recorded inside abattoir mainly are included renal cysts, hydronephrosis, pyelonephritis, white spotted kidney, large pale kidney, small shrunken kidney, congestion and pale infarction and some cases were found without any lesions [17].



**Figure 1:** Some Gross Lesions in Liver and Kidney. a) Showing liver cirrhosis ; b) Showing liver abscesses; c) Showing different liver tunnels lesions due to fascioliasis infection;d) Showing other liver lesion such as; fibrosis



**Figure 2:** Some Gross Lesions in Liver and Kidney. e) Showing liver cirrhosis and abscesses; f) Showing Kidney pyelonephritis.

The incidence of macroscopically cattle nephritis identified as the interstitial-type lymphocytic infiltration and follicular lymphoid hyperplasia, which may expand forming proliferative glomerulonephritis [18]. Hydronephrosis was seen in sheep either bilaterally or unilaterally, nephrolithiasis was observed in sheep both bilaterally or unilaterally [19].

In conclusion, in comparison between Ismailia and Elkharga Slaughterhouses our study recorded lower incidence of condemnation in Elkharga than Ismailia carcasses due to the nature of environment which is hot and dry that inhibit almost of diseases causative agents which leading to damaging of liver and kidney while in case of Ismailia slaughterhouse record has showed a wide spectrum and types of abnormality that occurring in traditional livestock herds. The present study provides baseline data for the future monitoring of healthy meat production in the Ismailia and Elkharga Slaughterhouses. The present study achieved at the level of Ismailia and Elkharga Slaughterhouses constitutes a starting point toward a better knowledge of some pathological abnormalities of sheep, cattle, and camel between upper and lower Egypt (Ismailia and Elkharga) cities.

## Acknowledgements

The authors gratefully thanks to Dr. Ahmed Mohammed Garhy, managers of Ismailia abattoirs for their help in the examination of the slaughtered animals and given the samples under the study. The authors also gratefully thank the managers of El-Kharga abattoirs for their help in the examination of the slaughtered animals and providing the samples under the study. This study was funded by the corresponding author.

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