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INTERNATIONAL JOURNAL
OF INNOVATIVE AND APPLIED RESEARCH

RESEARCH ARTICLE

Article DOI:10.58538/IJAR/2064

DOI URL: <http://dx.doi.org/10.58538/IJAR/2064>

Determination of Parasitic Qualities of Cow, Chicken and Goat Meat Sold in Owerri Municipal, Imo State, Nigeria

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Manuscript Info

Manuscript History

Received: 09 November 2023

Final Accepted: 13 December 2023

Published: December 2023

Abstract

The poor hygienic state of our abattoirs and markets where meats are sold have posed a major threat to public health. The microbial quality of meats sold in Owerri municipal Imo State, Nigeria was investigated with the aim of determining the microbial loads of meat sold in these areas. Samples numbering 110 were collected from 11 meat samples types sourced from cow, goat, and chicken. The eleven (11) meat sample types were fresh cow muscles (FCM), fresh cow intestine (FCI), fresh cow liver (FCL), and fresh cow towel (FCT). Fresh goat muscles (FGM), fresh chicken muscle (FCM), fresh goat intestine (FGI), fresh chicken intestine (FCI), Fresh goat liver (FGL), fresh chicken liver (FCL), fresh goat towel (FGT) etc. The organisms isolated were *Gardialambia* and *Entamoeba histolytica*. Among the parasites identified, *Gardialambia* has the highest percentage distribution occurrence of 63% followed by *Entamoeba histolytica* (27%). The presence of all these organisms can pose a major threat to public health. This calls for regular inspection of animals, abattoir environments and regular health check of abattoirs workers and butchers.

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INTRODUCTION

Meat contains high quality of protein, fat, carbohydrate, vitamins and minerals which are delicious and easily digestible food. All these nutritional requirements can be met easily if reasonable amount of meat is included in a diet. Meat is an animal flesh that is eaten as food and is an excellent source of protein in human diet. Its chemical composition is ideal for the growth of a wide range of spoilage and pathogenic bacteria. Chemical composition includes 72-75% of water, 21% Nitrogen compounds (19% proteins and 1.6% non-protein Nitrogen), 25-50% lipids, 1% of non-nitrogenous compounds (vitamins) and carbohydrate (very small amount of glycogen). Contaminated raw meat is one of the main sources of food-borne illnesses. According to Paul *et al.* [1], food borne diseases result from ingestion of bacteria, toxins present in the meat. The intensity of symptoms varies with the amount of contaminated meat ingested and the susceptibility of the individual to the toxin. These can result in economic and health losses.

Meat is gotten from animal like goat, cattle, chicken, etc., and they have essential parts that are used as meat e.g. beef (red meat), intestines (small and large intestine), and the skin which is also called node. Muscles of healthy animals do not contain micro-organisms; meat tissue get contaminated during the various stage of slaughter and transportation. The health status of animals prior to slaughtering and prevailing circumstances in the slaughter house contributes to the quality of meat from such animals [2]. In Nigeria particularly, Owerri in Imo state, slaughtering of animals usually takes place under very unhygienic conditions. Other primary sources of microbial contaminations are the equipment and physical facilities (stock, knives, containers, retail tables) used in each operation before the final is eaten [3].

Spoilage is caused by the practically unavoidable infection and subsequent decomposition of meat and by bacteria and fungi, which are borne by the animal itself, and the people handling the meat and their equipment. A great diversity of microbes inhabits fresh meat generally, but different types may become dominant depending on pH composition, textures, storage temperature and transportation method involves [4]. Therefore, this work is targeted to determine the bacterial qualities of cow, goat and chicken meat sold in Owerri municipality, Imo state, Nigeria.

MATERIALS AND METHODS

STUDY AREA

The study was conducted in Owerri Municipal Council area of Imo State, Nigeria.

SAMPLE COLLECTION

Fresh beef, chicken and goat meat will be purchased from different butchers, slaughter houses, open shops, markets within Owerri Municipality which includes Ekeonuwa market, Relief market, New market, etc. Samples will be promptly transported to Medical Laboratory Microbiology Laboratory, Imo State University, with insulated ice container from microbiological analysis.

FRESH MEAT SAMPLE PREPARATION

Ten grams of each of the solid samples will be weighed and aseptically taken into a sterilized jar containing 90mls sterile distilled water to produce a stock solution or homogenized solution

through blending at 300rpm for 10 minutes. 1ml aliquot of homogenized solution will be transferred for a test containing 9ml of sterile water to make a tenfold serial dilution and will be shaken vigorously. Sterile dilutions up to 10^{-5} will be prepared for microbiological analysis.

PARASITOLOGY ANALYSIS

Fresh animal tissue will be first teased and a drop of normal saline added to it on glass slide and examined under microscope. Ten grams of the meat samples, that is Cow, Chicken and Goat respectively will be weighed and aseptically taken into a sterile jar containing sterile water. It will be homogenized with sterile blender at 3000rpm for 1mins. 1ml each of the homogenate will be smeared on different portions of the slide (two smears on each slide). One of the smears will be stained with Lugol's iodine while the other will be unstained. The slide will be viewed under the microscope and concentration method can also be used for parasitic cysts, oocysts, eggs and larva using $\times 10$ and $\times 40$ objective lens.

STATISTICAL ANALYSIS

The data obtained from this study were analyzed using frequency distribution.

RESULTS

TABLE 1(a): SHOWS THE FREQUENCY AND PERCENTAGE OF PARASITES ON ANIMAL PARTS

GOAT PARTS						
PARASITES	MUSCLE	LIVE	INTESTIN	TOWE	FREQUENC	PERCENTAG
S	S	R	E	L	Y	E
						DISTRIBUTIO
						N
No. of Samples	10	10	10	10	40	
<i>Gardialambi</i>	—	—	1	1	2	100%
<i>a</i>						
<i>E.</i>	—	—	—	—	0	
<i>Histolytica</i>						
					02	

TABLE 1(b): SHOWS THE FREQUENCY AND PERCENTAGE OF PARASITES ON COW SAMPLE TYPE

COW PARTS						
PARASITES	MUSCLE	LIVE	INTESTI	TOWE	FREQUEN	PERCENTAG
	S	R	NE	L	CY	E
						DISTRIBUTIO
						N
No. of Samples	10	10	10	10	40	
<i>Gardialambia</i>	—	—	4	1	5	63%
<i>E. histolytica</i>	—	1	1	—	2	25%
<i>Teaniasaginata</i>	1	—	—	—	1	13%

TABLE 1(c): SHOWS THE FREQUENCY AND PERCENTAGE OF PARASITES ON CHICKEN SAMPLE TYPE

PARASITES	CHICKEN PARTS			FREQUENCY	PERCENTAGE DISTRIBUTION
	MUSCLES	LIVER	INTESTINE		
No. of Samples	10	10	10	30	
<i>Gardialambia</i>	---	---	---	0	
<i>E. histolytica</i>	---	---	1	1	100%
				01	

Table 2 shows the isolated parasites and their % distribution on fresh meat samples. *Gardialambia* has the highest frequency and percentage distribution of 7 (63%) followed by *Entaemoba histolytica* 3 (27%) and lastly *Teaniasaginata* 1 (9%).

Gardialambia is indication of contaminated food and water. It is an intestinal parasite that causes diarrheal disease (Gardiasis). *E. histolytica* causes amoebiasis (dysentery) and liver abscess.

TABLE 2: PARASITES ISOLATED ON DIFFERENT FRESH MEAT SAMPLES AND THEIR PERCENTAGE DISTRIBUTION NO OF ISOLATES

PARASITES	GOAT	COW	CHICKEN	FREQUENCY	DISTRIBUTION %
<i>Gardialambia</i>	2	5	---	7	63%
<i>Entaemoba histolytica</i>	---	2	1	3	27%
<i>Teaniasaginata</i>	---	1	--	1	9%
Total				11	100%

TABLE 4.9: SHOWS TOTAL NUMBER OF PARASITES DETECTED ON FRESH MEAT PARTS

Names of animal	No. of samples	Parasite species	Percentage distribution
Goat	40	2	18%
Chicken	30	1	9%
Cow	40	8	73%

In table 3, goat has the highest number of fungal species 6 (60%) followed by chicken and cow 2(17%) which have the same percentage distribution.

TABLE 3: SHOWS THE MYCOLOGICAL FINDINGS ON FRESH MEAT PARTS

Names of animal	No. of samples	Fungal species	Percentage distribution
Goat	40	6	60%
Chicken	30	2	17%
Cow	40	2	17%

DISCUSSION

The presence of parasite eggs and cyst in fresh meat samples can be attributed to poor handling practice during slaughter and washing of animal carcass. Some of the parasites may be contacted during grazing and some of animals serve as intermediate to the parasites [5-9].

Giardia lamblia was seen mostly in intestine and towels of the animal parts because it is an intestinal parasite. These can affect humans through contact with their faces, contaminated food, water and soil. Cow intestine and towel parts have the highest frequency distribution of 5 (63%), followed by goat intestine and towel. *E. histolytica* was seen in liver and intestine of animal parts with frequency distribution of 2 (25%) and these can cause amoebic dysentery and liver abscess.

CONCLUSION

Giardia lamblia was seen mostly in intestine and towels of the animal parts because it is an intestinal parasite and *E. histolytica* was seen in liver and intestine of animal parts. *Gardialambdia* causes dysentery and candidiasis respectively. All these poses great challenge to public health as it may serve as a source of food poisoning and death. Therefore, consumers should apply proper cooking methods to reduce microbial load.

REFERENCES

1. Paul, B. and Sylvia, A.B. (2014). "Microbiological Quality of Meat at the Abattoir and Butchery Levels in Kampala City, Uganda". *Internet Journal of Food Safety*, **16**:29-35.
2. Whyte, P., MCgIL, K. Cowley, D., Madden, R.H, Moran, I., McNamara, E., Moore, J.E. and cormican, M. (2004). "Occurrence of Campybacter in retail foods in Ireland". *International Journal of Food Microbiology*, 9(5): 111-118.
3. Jay, M.J., Loessner, M.J. and Golden D.E (2005). *Modern Food Microbiology*, Seventh Edition. Spring Publisher, USA. Pg. 41-77.
4. Ercolini D.F., Russo, E. Torrieri P., Masi and Villani, F. (2006). "Changes in the spoilage related microbiota of beef during refrigerated storage under different packaging conditions". *Journal of Applied and Environmental Microbiology*. **72**(7): 4663-4671.
5. Hassan, A. O., Obeagu, E. I., &Olamijuewon, P. B. (2022). Evaluation of different microbial pathogens associated with the external surfaces of houseflies and to determine the antibiotic susceptibility pattern of recovered bacterial pathogens in Owo. *Int. J. Curr. Res. Med. Sci*, 8(1), 1-13.

6. Esimai, B. N., &Obeagu, E. I. (2022). Prevalence of Isolated Agent in Diarrheal Infections of Children 0-3 Years in Anambra State in Relation to Sex: A Survey of Five Rural Communities. *J Biomed Sci*, 11(8), 73.
7. Nwosu, D. C., Nwanjo, H. U., Opara, A. U., Ojiegbe, G. C., &Obeagu, E. I. (2015). THE PREVALENCE OF GASTROINTESTINAL PARASITES IN CHILDREN OF SCHOOL AGE IN ORODO MBAITOLI LGA IN IMO STATE, NIGERIA.
8. Anyamaobi, O. P., Obeagu, E. I., Nwakulite, A., Nnatuanya, I. N., &Ezechukwu, C. (2021). PARASITOLOGICAL STUDY OF PALM OF MADONNA UNIVERSITY STUDENTS ELELE CAMPUS RIVERS STATE. *Madonna University journal of Medicine and Health Sciences ISSN: 2814-3035*, 1(2), 32-41.
9. Oladele, H. A., Ifeanyi, O. E., Akinleye, C., &Oluwanisola, D. O. (2022). Public health risks associated with fruits and vegetables at Owo markets. *International Journal of Current Research in Medical Sciences*, 8, 29-41.