BACTERIOLOGICAL ASSESMENT OF BEEF CATTLE SLAUGHTERED IN MINNA METROPOLIS.

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ABSTRACT
This study was conducted to establish the bacterial status of beef cattle slaughtered in minna metropolis. Five (5) abattoir/slaughter slabs were selected for the study, they include; Bosso, maitumbi, Chanchaga, Tunga and Maikunkele. A total of fifty (50) fresh beef sample were collected for a period of ten (10) weeks and analysed for total viable bacterial counts. Four (4) bacteria that were characterized and identified are Bacillus subtilis, staphylococcus aurens, streprococcus pneumonia and streprococcus faecalis. The total viable counts ranged from $9.0x10^4$ *-* $4.8x10^6$ *CFU/g. the mean viable bacterial counts for the various locations includes;* $1.03x10^6 \pm 2.36x10^6$, $1.55x10^5 \pm 0.08x10^5$, $5.11x10^5 \pm 1.21x10^5$, $1.48x10^6 \pm 3.12x10^6$ *and* $7.19x10^5 \pm 2.19x10^5$ *for Bosso, Maitumbi. Chanchaga, Tunga and maikunkele respectively. The results revealed high bacterial counts and significant differences. Tunga was revealed to have the highest mean bacterial count of* $1.48x10^6$ *CFU/g, while Maitumbi had the least mean bacterial count of* $1.55x10^5$ *CFU/g. it is recommended that the quality control system in use at the various abattoir/slaughter slabs be improved upon.*

INTRODUCTION

Beef is consumed in almost every part of the world. It generally has no religious taboos attached to it and so it is accepted by both the young and the old, the rich and the poor, and since it is a major source of protein, it is very important to consumers.

However, the high nutritive nature of fresh beef, along with a favourable water activity and appropriate PH, allows a vast variety of bacteria to grow on it (Krockel, 1995). In Nigeria, there are so many problems associated with bacterial content of meat. These problems include: pre-harvest and harvest source of meat contamination, transport system of meat and meat products. Processing and storage of meat and meat products in most cases, these meats after slaughter are transported on motorcycles with the rider carrying some of the meat on his body and some dropping on the ground.

Meat quality is dependent on the entire meat production chain, from where the animals are processed to the consumer. It covers sensory and microbiological properties (monin 1991). Therefore, this study is designed to establish the bacterialogical status of beef cattle slaughtered in Minna metropolis.

MATERIALS AND METHODS

Location of Study Area

This was carried out in Minna environs. Minna has a land mass of 228.5km square and lies between longitude $6^0 29^0$E and latitude $9^0 31$N of the equator. The average temperature ranges between 18-39^{0}c with an average monthly rainfall of 120mm (student handbook, 2008).

Methods of Collection of Samples

Five (5) abattoir/slaughter slabs were selected for this study. They include: Bosso modern abattoir, Mainkunkele, Tunga, Maitumbi and Chanchaga slaughter slabs. These abattoir/slaughter slabs were selected because they are the major abattoir/slaughter slabs where cattle are slaughtered in Minna on daily basis. A sample of fresh beef was collected from each of the abattoir/slaughter slabs once a week making a total of five (5) samples a week. They were collected in the morning and wrapped with foil papers to prevent contamination from external factors. The duration for the study was ten (10) weeks, making a total of fifty (50) sample used for the study. The sample collected were taken to the Department of Microbiology Laboratory, Federal University of Technology, Minna for bacteriological examination using Gram stain technique and enumeration of bacteria through the use of colouring counting machine.

The results obtained were subjected to statistical analysis using the SAS system involving the Analysis of Variance (ANOVA) procedure.

RESULTS AND DISCUSSION

Table 1.0 indicates the bacterial counts obtained from the agar plate counts. The total viable bacteria count in the sample were analysed and expressed as Log 10 CFU/g (colony forming

units per gram). The result of the total viable count of bacteria load of the fresh beef samples revealed that the samples had high bacteria counts ranging from $9.0x10^4 \pm 0.08x10^4$ to $4.8x10^6 \pm 0.08x10^6$ CFU/g. These values exceed the bacteria infective dose level of 10^5 CFU/g as stated by South African Department of Health (2000). Similarly, Nortje et al, (1995) from the outcome of their study, suggested that total viable count in the regions of 10^7 CFU/g in meat is regarded as the upper limit of acceptability and that such result suggest a deterioration of hygienic standards.

The result also revealed that the location having the highest bacteia count was Tunga, with a mean bacteria count of $1.48x10^6$ CFU/g, while Maitumbi had the least count of $1.55x10^5$ CFU/g.

The bacteria isolate were fully characterized and identified as species of staphylococcus aureus, Bacillus subtilis, strephylococcus pneumonia, and staphylococcus faecalis as shown in table 2.0. The presence of this bacteria isolate could suggest poor

Hygienic and working practices of the meat handlers during the processing stage as well as lack of sterilization of utensils and working surfaces which confirms earlier report (Atana ssova *et al*, 2001) that humans have often been reported tobe carrier of staphylococci. According to (Jay, 1996), the first contamination is usually caused by non-sterilized knives and surface at slaughtering. Streprococcus faecalis as found in some of the sample analysed is an indication of faecal pollution of some of the fresh beef samples. The bacteria are of zoonotic importance, in that they have the ability to cause food borne infection when consumed by humans. For instance, staphylococcus aureus has ability to cause boil (skin infection) as well as respiratory and urinary tract infections. It can also cause infertility. Infection caused by Bacillus subtilis in characterized by abdominanl pains, profuse watery diarrhea and rectal tenesmus.

CONCLUSION

The results of this study has shown that beef cattle slaughtered in various abattoir/slaughter slabs in Minna metropolis had high bacterial counts exceeding the bacterial infective dose level, indicating that the sanitary procedures might have been compromised

ACKNOWLEDGEMENT

I wish to acknowledge the technical assistance given by the technical staff of the microbiology laboratory of the Department of Microbiology, Federal University of Technology, Minna.

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Table 1. Total Viable Count of Bacteria Isolate from Fresh Beef Samples from Selected Abattoir/slaughter Slabs in Minna Metropolis (CFU/g).

	Location					
	Maitumbi	Chanchaca	Tunga	Maikunkele	Level of Significance	RSA IDL
$\pm 0.85 \times 10^{6b}$	$6.05 \times 10^{5} \pm 0.06 \times 10^{5b}$	$7.2 \times 10^{5} \pm 0.14 \times 10^{5}$	$5.2 \times 10^{5} \pm 1.08 \times 10^{5a}$	$2.5 \times 10^{6} \pm 0.05 \times 10^{5b}$	*	10^{5}
$\pm 0.07 \times 10^{5b}$	$4.0 \times 10^{5} \pm 0.04 \times 10^{5}$	$6.2 \times 10^{5} \pm 0.13 \times 10^{5a}$	$4.8 \times 10^{5} \pm 0.08 \times 10^{5b}$	$2.8 \times 10^{5} \pm 0.04 \times 10^{5c}$	*	10^{5}
$\pm 0.08 \times 10^{5b}$	$6.4 \times 10^{5} \pm 0.05 \times 10^{5b}$	$1.0 \times 10^{6} \pm 0.14 \times 10^{5a}$	$6.0 \times 10^{5} \pm 0.09 \times 10^{5b}$	$1.2 \times 10^{5} \pm 0.07 \times 10^{5b}$	*	10^{5}
$\pm 0.09 \times 10^{5b}$	$5.0 \times 10^{5} \pm 0.06 \times 10^{5}$	$2.0 \times 10^{6} \pm 0.20 \times 10^{5c}$	$1.4 \times 10^{6} \pm 0.08 \times 10^{5a}$	$8.2 \times 10^{5} \pm 0.08 \times 10^{5c}$	*	10^{5}
$\pm 0.08 \times 10^{5b}$	$8.2 \times 10^{5} \pm 0.04 \times 10^{5}$	$6.7 \times 10^{5} \pm 0.11 \times 10^{5a}$	$8.0 \times 10^{4} \pm 0.07 \times 10^{4c}$	$9.3 \times 10^{4} \pm 1.01 \times 10^{4e}$	*	10^{5}
$\pm 0.08 \times 10^{5b}$	$2.1 \times 10^{6} \pm 0.05 \times 10^{5}$	$1.0 \times 10^{6} \pm 0.20 \times 10^{5b}$	$1.2 \times 10^{6} \pm 0.85 \times 10^{5a}$	$1.5 \times 10^{6} \pm 0.13 \times 10^{5a}$	*	10^{5}
$\pm 0.05 \times 10^{5}$	$1.0 \times 10^{6} \pm 0.1 \times 10^{5}$	$1.0 \times 10^{6} \pm 0.1 \times 10^{5b}$	$2.0 \times 10^{6} \pm 1.06 \times 10^{5a}$	$1.8 \times 10^{6} \pm 0.10 \times 10^{5b}$	*	10^{5}
$\pm 0.04 \times 10^{5}$	$6.0 \times 10^{5} \pm 0.10 \times 10^{5}$	$1.0 \times 10^{6} \pm 0.1 \times 10^{5a}$	$3.7 \times 10^{5} \pm 0.12 \times 10^{5d}$	$4.7 \times 10^{5} \pm 0.09 \times 10^{5c}$	*	10^{5}
$\pm 0.06 \times 10^{5}$	$6.0 \times 10^{5} \pm 0.20 \times 10^{5}$	$1.0 \times 10^{6} \pm 0.1 \times 10^{5a}$	$1.2 \times 10^{6} \pm 0.09 \times 10^{5b}$	$1.3 \times 10^{6} \pm 0.85 \times 10^{5a}$	*	10^{5}
$\pm 0.05 \times 10^{5}$	$8.6 \times 10^{5} \pm 0.14 \times 10^{5}$	$2.1 \times 10^{6} \pm 0.20 \times 10^{5a}$	$4.5 \times 10^{5} \pm 0.12 \times 10^{5d}$	$1.7 \times 10^{6} \pm 0.75 \times 10^{5}$	*	10^{5}
$\pm 2.16 \times 10^{5}$	$1.55 \times 10^{6} \pm 0.16 \times 10^{5}$	$5.11 \times 10^{5} \pm 1.21 \times 10^{5}$	$1.48 \times 10^{6} \pm 0.10 \times 10^{5}$	$7.19 \times 10^{5} \pm 2.19 \times 10^{5}$		10^{5}

Within the same row, values bearing different superscript are significantly ($P<0.05$) different

South African Department of Health

* = significant ($P<0.05$)

Effective Dose Level

Table 2.0 Characteristics and Identification of Bacteria Isolated from Fresh Beef Samples Collected from the Various Abattoir slaughter Slabs in Minna Metropolis.

ocation	Gram's reaction	Catalase test	Coagulase test	Starch Hydrolysis test	Hydrogen sulphide	Methyl red test	Voges proskauer test	Oxidase test	Motility test	Indole test	Organism
losso	+c	+	+	-	-	-	-	-	-	-	*Staphylococcus auresus*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus faecalis*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus pnemoniea*
laitumbi	+R	+	-	+	-	-	+	-	+	-	*Bacillus subtilis*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus faecalis*
	+c	+	+	-	-	-	-	-	-	-	*Streptococcus aureus*
hanchaga	+c	+	+	-	-	-	-	-	-	-	*Staphylococcus auresus*
	+R	+	-	+	-	-	+	-	+	-	*Bacillus subtilis*
unga	+c	+	+	-	-	-	-	-	-	-	*Staphylococcus auresus*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus faecalis*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus pnemoniea*
	+R	+	-	+	-	-	+	-	+	-	*Bacillus subtilis*
laikunkele	+c	+	+	-	-	-	-	-	-	-	*Staphylococcus auresus*
	+c	-	-	-	-	-	-	-	-	-	*Streptococcus faecalis*

+R = positive rod shape - = Negative Result

+C = positive cocci shape + = Positive Result