

PREVALENCE OF MICROFLORA IN LAMB MEAT AND OFFAL AT BAGHDAD ABATTOIR

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ABSTRACT

A study on a hundred samples of lamb meat and offal were done for a year. The bacterial microflora of lamb meat and offal from lamb 1-2 year old were isolated. The prevalence of microorganisms identified in this study was Staphylococci, Corynebacterium, Streptococci, Micrococcus, Salmonella, *Escherichia coli* and Yeast.

The positive isolates were high in spring and early summer while the positive isolates were low in autumn and early winter. Staphylococci and Salmonella were predominant over all positive microorganisms. Lymph nodes and kidneys yielded more numbers of Salmonella and Staphylococci than meat, liver and spleen. Fifteen *Salmonella typhimurium* (28%) out of 53 as a total number of Salmonella serotypes were identified. Out of eight was the total number of Staphylococci six (40%) of them were coagulase positive. This study covers the distribution of indigenous microflora of meat, and offal.

INTRODUCTION

In recent years the microbiology of lamb's meat and offal as a food has become of great concern for public health. The increasing incidence of food poisoning among the consumers of animal products was due to the different techniques of packing and cooking. The usual source of infective materials is the resistant carriers which are usually of great epidemiological significance (1, 2). Transferring of the pathogenic bacteria from animal origin might carry resistance to antibiotics which are added to the ration and might in turn transfer this resistance to commensally bacteria in human intestines (3). Poor hygiene process and due to direct contact with infected materials during the production process may lead to the contamination in meat and offal (4). High consumption of meat and offal makes it necessary to be very accurate to pass these products to be fit for human consumption.

Although, meat and offal looked to be a healthy but still some microorganisms could be isolated. Many investigators found that the source of infection especially the food contaminated with Salmonella and / or enterotoxigenic strains of *Staphylococcus aureus* is a potential hazard for the human life (3, 5, 6, 7). Alternatively, few reports are recorded that the presence of Streptococci, *Corynebacterium* and Yeast in low ratio in lamb meat and offal (7, 8, 9).

The isolation of *Staphylococcus aureus* were cultured on Baird Parker agar while the Salmonella were grown on SS agar after enrichment in tetrathionate broth. Different microorganisms including *Staphylococcus aureus* and Salmonella were isolated directly from restaurant shops at the street foods in Nigeria (10). Both *Staphylococcus aureus* and Salmonella were found to be the predominant amongst the isolations from muscle animal's tissues (11, 12). Numbers & types of microorganisms might be affected by refrigeration, thawing freezing and different systems of packing (13). This paper covers the study of health meat and offal of slaughtered lamb in Baghdad slaughter house and passed to be fit for human consumption.

MATERIALS AND METHODS

Fresh healthy looking meat, liver, spleen, lymph node and kidney samples were obtained from Baghdad slaughtered house. To overcome spoilage and putrefaction the samples should be kept aseptically in ice box (2-5°C) during 2-3 hours transportation to the laboratory. Sampling was achieved by washing with sterile distilled water then aseptically incised into small pieces about one cubic cent meter. Aseptically 20g was transferred from the package into a sterile stomacher size 400ml bag, adding 180 ml of sterile 0.1% peptone water (pH 6.8-7.2). Sample was blended in stomacher size 400ml for 2 minutes.

First experiment was done as follows: One ml of peptone water was transferred into 9 ml nutrient broth and brain heart infusion broth. Duplicate samples with control were incubated for 48 hours at 37°C aerobically throughout the whole study. Gram stain from tubes showing turbidity (growth) was done then subcultured on solid media (Blood agar, MacConkey, EMBA). Suspected colonies were picked up to be classified biochemical and serologically. Identification and coagulase testing for bacteria, biochemical reactions were done (14).

Second experiment was done as follows: One ml peptone water transferred into 9ml tetrathionate broth. Duplicate tetrathionate broth plus control were incubated at $41.5 \pm 0.5^\circ\text{C}$ for 22 hours (15). Directly from tetrathionate broth plated on MacConkey, SS agar and Brilliant

green agar. These plates were incubated at $41.5 \pm 0.5^{\circ}\text{C}$ for 22hours. Suspected colonies were picked up to identify biochemical & serologically according to the method mentioned by (16).

RESULTS

Different microorganisms were grown on different culture media at different temperature. Staphylococcus aureus was found to be predominant amongst the isolates from muscle tissues of animals. Out of a hundred specimens studied 73 isolates yielded different types of microorganisms from peptone water were 20 positive isolates and from tetrathionate broth were 53.

During the months of spring and early summer (April, May and June) 45 samples were positive In autumn and early winter (September, October, November and December) 28 only were positive (**Table 1**). The types of microorganisms were Staphylococcus aureus 6%, E. coli 2%, Corynebacterium 6%, Streptococci 2%, Micrococcus 1% and Yeast 1%, the results were pooled (**Table 2**).

Total Salmonella serotypes were identified from meat, lymph nodes, liver and kidney are 53. The percentage of *S. typhimurium* is 28.3%, *S. enteritidis* and *S. virchow* are 18.9% and *S. dublin* and *S. salford* are 15% while other unclassified Salmonella are 3.8%. Number of isolates in meat are 6, liver 1, spleen none, lymph node 20, and kidney 26 (**Table 3**).

Media: - Blood agar, MacConkey, Nutrient broth, Brain Heart infusion, EMBA, Salmonella-Shigella agar and Brilliant green Agar (Difco).

Table 1. Seasonal Distribution of Microorganisms

	Staph.	E. coli	Coryn	Micro	Str	Yeast	Sal	Total	%
Spring and Summer	6	1	5	1	1	0	31	45	61.6
Autumn and Early Winter	2	1	1	0	1	1	22	28	38.4

Table 2. Types of Microorganisms Isolates

Strain	Staphy- lococci	E. Coli	Coryne- bacteria	Micro cocci	Strept- ococci	Yeast
Percent of Isolations	8*	2	6	2	1	1

*Out of the * *Staphylococcus aureus* 2of them were coagulase negative

**Out of 6 the isolates of *Corynebacterium* one of them *Corynebacterium*.

Table 3. Numbers of Salmonella Serotypes isolated from meat (M), Liver (L), Spleen (S), Lymph node (LN) and Kidney (K).

Salmonella Numbers (S. No.).

Salmonella serotypes	M	L	S	LN	K	S.No.	%
<i>S. dublin</i>				4	4	8	15
<i>S. enteritidis</i>	2			3	5	10	18.9
<i>S.typhimurium</i>	4			6	5	15	28.3
<i>S.virchow</i>				4	6	10	18.9
<i>S.salford</i>		1		3	4	8	15
Other S.					2	2	3.8
Total	6	1	0	20	26	53	100

DISCUSSION

Grilled meat and offal are largely consumed in this country and usually are served as medially cooked. Bacteria if present might result in gastro-intestinal troubles amongst the consumer; also if meat, lymph nodes and offal are not well stored or freshly used will be a good medium for the growth and multiplication of bacteria. Meat, lymph node and offal yielded growth of different types of microorganisms when kept unchilled in summer for 3-4 hours (temperature 40-45°C). Salmonella in meat, lymph node and other offal are the main sources of Salmonella infection to man (17). Descending urinary tract infection as cystitis might result in sheep from cases of proliferated glomerulo-nephritis (18).

Immediate chilling, proper storage and perfect cooking are important factors in minimizing or limiting the number of microorganisms. Avoiding public health hazard due to food contamination, proper hygiene are very necessary to make sure the infected materials that might be present in apparently healthy samples do not transfer to the consumer. The predominance of Staphylococci was overwhelming over the remaining types of microorganisms. Growth was obtained directly on blood agar (12). Our results revealed that ten percent of *E. coli* was isolated from lamb meat and offal. These findings were higher than the results found by (19). The differences in the percentage of the results due to the types of the samples and due to the specific strain of *E. coli* 0157:H7.

Fifty three *Salmonella* isolates were determined biochemically and serologically. *Salmonella typhimurium* was the highest isolates 28.3% and *Salmonella virchow* was 18.9% while *Salmonella dublin* and *Salmonella salford* were the lowest isolates 15% if the other types of *Salmonella* 3.8% are excluded.

This study is covered the prevalence of indigenous microflora in meat and offal of lamb which agreed with the results by (20, 21, 22, 23). The isolations especially of salmonella serotypes that have been incriminated in human food poisoning are of great public health importance. The fact that 10 per cent of animals slaughtered for food purposes were found to be infected, suggests that these carcasses may cause human infection (18). Isolation from meat emphasizes the gravity of the potential dangers to persons engaged in handling meat and also those who handle and consume meat (19).

الأغنام وجود الإحياء المجهريّة في اللحم وأحشاء الذبيحة في

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الخلاصة

فحصت عينات اللحم واحشاء الذبيحة لمائة خروف عمر 1- 2 سنة على مدار عام. عزلت في هذه الدراسة الاحياء المجهريّة التالية: المكورات العنقودية والسبحية، المكورات، والوندنيات بالاضافة الى السالمونيلا، اشيريشيا القولون والخميرة. كانت عزلات الاحياء المجهريّة الإيجابية اعلى في الربيع ومبكراً في الصيف بينما كانت منخفضة في الخريف ومبكراً في الشتاء. سادت اعداد المكورات العنقودية والسالمونيلا على الاحياء المجهريّة الإيجابية الأخرى. أنتجت العُقَد اللمفاويّة والكلي أعداداً أكثر من السالمونيلا والمكورات العنقودية مقارنة باللحم، الكبد، والطحال. صنفت خمسة عشرة عزلة كسالمونيلا تايفيميوريم (28%) من 53 العدد الكلي لعنقوديات السالمونيلا المعزولة، وستة (40%) من المكورات العنقودية من مجموع ثمانية كانت ايجابية لتخنربلازما دم الارنب. غطت هذه الدراسة وجود البكتريا الرمية في لحم واحشاء الاغنام.

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