

## ASSESSMENT OF THE HYGIENIC PERFORMANCE OF BEEF CARCASS DURING DRESSING PROCESS

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### ABSTRACT

*One hundred and twenty swab samples were collected from three parts of carcasses slaughtered in Kafr – El – Shiekh city abattoir and El –Mahaella EL-kubera city abattoir (60 of each). The swabs were taken from brisket; rump and thin flank of carcasses (20 of each site). The microbiological examination for the swab samples revealed that the mean value  $\pm$  S.E of Total Aerobic Plate Count (TAPC) was  $35 \times 10^4 \pm 1.3 \times 10^4$ ; Psychrotrophic count was  $24 \times 10^4 \pm 1.4 \times 10^4$  Coliform count was  $76 \times 10^2 \pm 1.02 \times 10^2$  E.coli count was  $8 \times 10^2 \pm 0.3 \times 10^2$ ; Staphylococcus count was  $12 \times 10^3 \pm 1.02 \times 10^3$ ; Mould count was  $1.4 \times 10^3 \pm 1.09 \times 10^3$ ; Yeasts count was  $2 \times 10^3 \pm 1.01 \times 10^3$  CFU/  $\text{Cm}^2$ ; from brisket region. From rump region the TAPC was  $15 \times 10^4 \pm 1.4 \times 10^4$  Psychrotrophic count was  $11 \times 10^4 \pm 1.09 \times 10^4$ ; Coliform count was  $11 \times 10^2 \pm 1.01 \times 10^2$ ; E.coli count was  $4 \times 10^2 \pm 0.1 \times 10^2$  Staphylococcus count was  $17 \times 10^3 \pm 1.1 \times 10^3$ ; Mould count was  $1.2 \times 10^4 \pm 0.09 \times 10^4$  and yeasts count was  $3.3 \times 10^4 \pm 0.9 \times 10^3$  CFU/ $\text{Cm}^2$ . From thin flank TAPC was  $18 \times 10^4 \pm 1.3 \times 10^4$ ; Psychrotrophic count was  $13 \times 10^4 \pm 1.1 \times 10^4$ ; Coliform count was  $18 \times 10^3 \pm 1.06 \times 10^3$ ; E.coli count was  $4 \times 10^2 \pm 0.13 \times 10^2$ ; Staphylococcus count  $7 \times 10^3 \pm 1.06 \times 10^3$ ; Mould was  $1.7 \times 10^3 \pm 0.02 \times 10^3$  and Yeasts count was  $1 \times 10^3 \pm 0.001 \times 10^3$ ; CFU/  $\text{Cm}^2$  for Kafr – El – Shiekh abattoir. Concerning El Mahaella El-Kubera abattoir the microbiological examination for swab samples as following; TAPC*

was  $17 \times 10^4 \pm 1.03 \times 10^4$ ; Psychrotrophic count was  $18 \times 10^3 \pm 1.11 \times 10^3$ ; Coliform count was  $9 \times 10^3 \pm 1.04 \times 10^3$ ; E.coli count was  $5 \times 10^2 \pm 1.06 \times 10^2$ ; Staphylococcus count was  $2.7 \times 10^3 \pm 1.2 \times 10^3$ ; Mould count was  $2.3 \times 10^5 \pm 1.12 \times 10^5$  and Yeasts count was  $42 \times 10^3 \pm 1.07 \times 10^3$  for brisket region CFU/ Cm<sup>2</sup>. while rump region the TAPC was  $22 \times 10^4 \pm 1.1 \times 10^4$ ; Psychrotrophic count was  $17 \times 10^3 \pm 1.02 \times 10^3$ ; Coliform count was  $17 \times 10^3 \pm 1.2 \times 10^3$  E.coli count was  $7 \times 10^2 \pm 1.08 \times 10^2$ ; Staphylococcus count was  $6 \times 10^4 \pm 1.1 \times 10^4$ ; Mould count was  $1.5 \times 10^3 \pm 1.11 \times 10^3$ ; Yeasts count was  $2 \times 10^3 \pm 1.04 \times 10^3$  CFU / Cm<sup>2</sup>. For thin flank the TAPC count was  $18 \times 10^4 \pm 1.05 \times 10^4$ ; Psychrotrophic count was  $15 \times 10^3 \pm 1.04 \times 10^3$ ; Coliform count was  $8 \times 10^3 \pm 1.11 \times 10^3$ ; E.coli count was  $4 \times 10^2 \pm 1.1 \times 10^2$ ; Staphylococcus count was  $3.2 \times 10^4 \pm 1.06 \times 10^4$ ; Mould count was  $8 \times 10^3 \pm 1.04 \times 10^3$ ; and Yeasts count was  $1 \times 10^5 \pm 1.06 \times 10^5$ ; CFU / Cm<sup>2</sup>. Moreover; the incidence of isolated E.coli from Kafr – El – Sheikh abattoir of brisket region was 45%; rump was 15% and thin flank was 55% from the examined swab samples; while E.coli serotyping revealed that EPEC. Strain O55: K59 (B5) was 40% of the total swab samples; 20% of strain O86: K61 (B7); 25% for O119 : K69 (B19) while for EIEC strain O124: K72 (B17) 30% and O126 : K74 (B16) was 55%. Concerning El Mahaella El-Kubera abattoir E. coli incidence was 35%; 10% and 40% from brisket; rump and thin flank for examined samples. The isolated strains of total examined samples were 20%; 10%; 35%; 5% and 25%; O55: K59 (B5); O86 : K61 (B7); O119: K69 (B19) for EPEC strains; O124 : K72 (B17) and O126 : K71 (B16) for EIEC strains; respectively. The obtained results were discussed.

## INTRODUCTION

The hygiene of slaughter in a broad sense; embraces a variety of considerations such as; on one hand design and layout of building systems of control and inspection and hygiene of personnel; besides; on the other hand the parasites and microorganisms which the meat contains. Apart from aesthetic latter for example; the physical separation of unclean from clean areas is intended to diminish contamination of the meat from soil; hides or from gut contents. To judge whether one particular slaughtering procedure has hygienic advantages over another; on a factual basis as distinct from visual imperession; means comparison of the microbiological status of carcasses subjected to the two procedures;(Ingram and Roberts1976).To decide whether the hygiene of particular abattoir is salis factory; in practice requires examination of some sample taken by an inspector to represent that abattoir's output while to decide whether one abattoir is better than another requires the comparison of two such lots of material. So this paper accordingly examines some attempted comparisons between abattoirs or circumstances in the light of variations in the bacteriological status in individual meat carcasses; by:

- 1- Total Aerobic Plate count (TAPC).
- 2- Total Psychrotrophic count.
- 3- Total Coliform count.
- 4- Total Staphylococcus.
- 5- Total Eschrichia coli count.
- 6- Isolation and Identification of Isolated Eschrichia coli.
- 7- Total Mould and Yeasts count.
- 8- Significance of isolates.

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## MATERIAL AND METHODS

### 1- collection of samples:-

One hundred and twenty swab samples (60) of each of carcasses slaughtered in Kafr El – Shiekh abattoir and El Mahaella El-Kubera abattoir – Each Carcass was swabed from three sites; the bresket; rump and thin flank (20) of each site were collected and transferred to the laboratory under complete septic condition without undue delay in an insulated ice box.

### 2- Preparation of samples (*ICMSF; 1986*):-

The swab area of carcasses was 25cm<sup>2</sup> and put into 225 ml of sterile pepton water 0.1% and shaken well for minutes to provide a dilution of 10<sup>-1</sup>. One ml of the original dilution was transferred with a sterile pipette to another test tube containing 9 ml of sterile peptone water 0.1% to give 10<sup>-2</sup> dilution from which decimal serial dilutions were prepared.

3- Total *Aerobic plate* count was carried out according to *APHA (1992)*.

4- Total *Psychrotrophic* count was carried out according to *APHA (1992)*.

5- Total *Coliform count* was carried out according to *ICMSF (1978)*.

6- *Escherichia coli* count was carried out according to *ICMSF (1978)*.

7- *Staphylococcus aureus* was counted and identified according to *ICMSF (1978)*.

8- *Staphylococcus aureus* was counted and identified according to (*ICMSF; 1978*).

9- *E.coli* was isolated and serologically identified according to (*Cruickshank et al . 1975*) , (*ICMSF; 1978*). *Edwards and Ewing (1972)* and of *Krieg and Holt (1984)*.

## RESULTS

**Table (1):** Statistical analytical results of TAPC; *Psychrophilic* and *Coliform* count of swab samples of slaughtered beef carcasses in Kafr – El Shiekh abattoir.

Samples	Total Aerobic count			Psychrotrophic count			Coliform count		
	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E
Brisket	57x10 <sup>4</sup>	20x10 <sup>4</sup>	35x10 <sup>4</sup> ± 1.3x10 <sup>4</sup>	48x10 <sup>4</sup>	12x10 <sup>3</sup>	24x10 <sup>4</sup> ± 1.4x10 <sup>4</sup>	43x10 <sup>3</sup>	14x10 <sup>2</sup>	76x10 <sup>2</sup> ± 1.02x10 <sup>2</sup>
Rump	32x10 <sup>4</sup>	8x10 <sup>3</sup>	15x10 <sup>4</sup> ± 1.4x10 <sup>4</sup>	64x10 <sup>4</sup>	5x10 <sup>3</sup>	11x10 <sup>4</sup> ± 1.09x10 <sup>4</sup>	22x10 <sup>3</sup>	2x10 <sup>2</sup>	11x10 <sup>2</sup> ± 1.01x10 <sup>2</sup>
Thin flank	48x10 <sup>4</sup>	24x10 <sup>3</sup>	18x10 <sup>4</sup> ± 1.3x10 <sup>4</sup>	67x10 <sup>4</sup>	21x10 <sup>2</sup>	13x10 <sup>4</sup> ± 1.1x10 <sup>4</sup>	32x10 <sup>3</sup>	1x10 <sup>3</sup>	18x10 <sup>3</sup> ± 1.06x10 <sup>3</sup>

**Table (2):** Statistical analytical results for swab samples from beef carcasses slaughtered in Kafr – El – Shiekh abattoir. (E. Coli count and staphylococcus count).

Samples	Escherichia coli count			Staphylococcus aureus count		
	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E
Brisket	1700	70	8x10 <sup>2</sup> ± 0.3x10 <sup>2</sup>	2x10 <sup>4</sup>	460	12x10 <sup>3</sup> ± 1.02x10 <sup>3</sup>
Rump	1100	23	4x10 <sup>2</sup> ± 0.1x10 <sup>2</sup>	5x10 <sup>4</sup>	350	17x10 <sup>3</sup> ± 1.1x10 <sup>3</sup>
Thin flank	1400	40	4x10 <sup>2</sup> ± 0.13x10 <sup>2</sup>	3x10 <sup>4</sup>	418	7x 10 <sup>3</sup> ± 1.06x10 <sup>3</sup>

**Table (3):** Statistical analytical results for swab samples from beef carcasses slaughtered in Kafr – El – Shiekh abattoir. (Mould and yeast count).

Samples	Mould count			Yeast count		
	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E
Brisket	5x10 <sup>3</sup>	10	1.4x10 <sup>3</sup> ± 1.09x10 <sup>3</sup>	4.8x10 <sup>3</sup>	7x10 <sup>3</sup>	2x10 <sup>3</sup> ± 1.01x10 <sup>3</sup>
Rump	1x10 <sup>5</sup>	10	1.2x10 <sup>4</sup> ± 0.09x10 <sup>4</sup>	2x10 <sup>3</sup>	50	3.3x10 <sup>4</sup> ± 0.9x10 <sup>3</sup>
Thin flank	4x10 <sup>3</sup>	1x10 <sup>3</sup>	1.7x10 <sup>3</sup> ± 0.02x10 <sup>3</sup>	2.1x10 <sup>3</sup>	1x10 <sup>3</sup>	1x10 <sup>3</sup> ± 0.001x10 <sup>3</sup>

Max = Maximum

Min = Minimum

S.E = Standard Error

**Table (4):** Statistical analytical results for swab samples from beef carcasses slaughtered in El Mahaella El-Kubera abattoir (TAPC; Psychrotrophic count and Coliform counts).

Samples	Aerobic plate count			Psychrotrophic count			Coliform count		
	Max.	Min.	Mean± S.E	Max.	Min.	Mean± S.E	Max.	Min.	Mean± S.E
<b>Brisket</b>	36x10 <sup>4</sup>	6x10 <sup>3</sup>	17x10 <sup>4</sup> ± 1.03x10 <sup>4</sup>	32x10 <sup>3</sup>	5x10 <sup>2</sup>	18x10 <sup>3</sup> ± 1.11x10 <sup>3</sup>	24x10 <sup>3</sup>	1x10 <sup>3</sup>	9x10 <sup>3</sup> ± 1.04x10 <sup>3</sup>
<b>Rump</b>	68x10 <sup>4</sup>	15x10 <sup>3</sup>	22x10 <sup>4</sup> ± 1.1x10 <sup>4</sup>	38x10 <sup>3</sup>	3x10 <sup>2</sup>	17x10 <sup>3</sup> ± 1.02x10 <sup>3</sup>	40x10 <sup>3</sup>	20x10 <sup>2</sup>	17x10 <sup>3</sup> ± 1.2x10 <sup>3</sup>
<b>Thin flank</b>	38x10 <sup>4</sup>	15x10 <sup>3</sup>	18x10 <sup>4</sup> ± 1.05x10 <sup>4</sup>	32x10 <sup>3</sup>	9x10 <sup>2</sup>	15x10 <sup>3</sup> ± 1.04x10 <sup>3</sup>	22x10 <sup>3</sup>	16x10 <sup>2</sup>	8x10 <sup>3</sup> ± 1.11x10 <sup>3</sup>

**Table (5):** Statistical analytical results for swab samples from beef carcasses slaughtered in *El Mahaella El-Kubera* abattoir (E.coli count and Staphylococcus count).

Samples	Escherichia coli count			Staphylococcus count		
	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E
<b>Brisket</b>	11x10 <sup>2</sup>	210	5x10 <sup>2</sup> ± 1.06x10 <sup>2</sup>	1 x10 <sup>4</sup>	200	2.7x10 <sup>3</sup> ±1.2x10 <sup>3</sup>
<b>Rump</b>	11x10 <sup>2</sup>	23	7x10 <sup>2</sup> ± 1.08x10 <sup>2</sup>	8 x10 <sup>4</sup>	100	6.0x10 <sup>4</sup> ±1.1x10 <sup>4</sup>
<b>Thin flank</b>	11x10 <sup>2</sup>	23	4x10 <sup>2</sup> ± 1.1x10 <sup>2</sup>	6.4x10 <sup>4</sup>	2.6x10 <sup>3</sup>	3.2x10 <sup>4</sup> ±1.06x10 <sup>4</sup>

**Table (6):** Statistical analytical results for swab samples from beef carcasses slaughtered in El Mahaella El-Kubera abattoir (Mould and Yeast count).

Samples	Mould count			Yeast count		
	Max.	Min.	Mean ± S.E	Max.	Min.	Mean ± S.E
<b>Brisket</b>	1.9x10 <sup>6</sup>	10	2.3x10 <sup>5</sup> ±1.12x10 <sup>5</sup>	4.8x10 <sup>3</sup>	10	42x10 <sup>3</sup> ±1.07x10 <sup>3</sup>
<b>Rump</b>	7x10 <sup>3</sup>	10	1.5x10 <sup>3</sup> ±1.11x10 <sup>3</sup>	2x10 <sup>3</sup>	10	2x10 <sup>3</sup> ±1.04x10 <sup>3</sup>
<b>Thin flank</b>	3.4x10 <sup>4</sup>	10	8x10 <sup>3</sup> ± 1.04x10 <sup>3</sup>	2.1x10 <sup>3</sup>	1.1x10 <sup>2</sup>	1x10 <sup>5</sup> ±1.06x10 <sup>5</sup>

Max = Maximum

Min = Minimum

S.E = Standard Error

**Table (7):** Incidence of E. Coli isolated from examined samples of El Mahaella El-Kubera abattoir.

Samples	Number of examined sample	Positive samples	
		No	%
Brisket	20	7	35%
Rump	20	2	10%
Thin flank	20	8	40%

**Table (8):** Isolated strains of E. coli from examined samples of El Mahaella El-Kubera abattoirs

Samples	Brisket		rump		Thin flank		Total	
	No	%	No	%	No	%	No	%
O55:K59(B5)(EPEC)	2	10%	-	-	2	10%	4	20%
O86:K61(B7)(EPEC)	-	-	1	5%	1	5%	2	10%
O119:K69(B19)(EPEC)	1	5%	2	10%	4	20%	7	35%
O124:K72(B17)(EIEC)	-	-	-	-	1	5%	1	5%
O126:K71(B16)(EIEC)	3	15%	1	5%	1	5%	5	25%

**Table (9):** Incidence of E.coli in examined samples from Kafr – El – Shiekh abattoir.

Samples	Number of examined sample	Positive samples	
		No	%
Brisket	20	9	45%
Rump	20	3	15%
Thin flank	20	11	55%

**Table (10):** Isolated strains E.coli from examined samples of Kafr – El – Shiekh abattoir.

Samples	Brisket		rump		Thin flank		Total	
	No	%	No	%	No	%	No	%
O55:K59(B5) EPEC	3	15%	1	5%	4	20%	8	40%
O86:K61(B7) EPEC	1	5%	2	10%	1	5%	4	20%
O119:K69(B19) EPEC	1	5%	3	15%	1	5%	5	25%
O124:K72(B17) EIEC	2	10%	1	5%	3	15%	6	30%
O126:K71(B16) EIEC	4	20%	2	10%	5	25%	11	55%

## DISCUSSION

Results in tables (1; 2; 3) revealed that the mean value  $\pm$ S.E for *TAPC*; *Psychrotrophic* count; *Coliform* count; *Escherichia coli* count; *Staphylococcus aureus* count and *Mould* and *Yeast* count were  $35 \times 10^4 \pm 1.3 \times 10^4$ ;  $24 \times 10^4 \pm 1.4 \times 10^4$ ;  $76 \times 10^2 \pm 1.02 \times 10^2$ ;  $8 \times 10^2 \pm 0.3 \times 10^2$ ;  $12 \times 10^3 \pm 1.02 \times 10^3$  and  $1.4 \times 10^3 \pm 1.09 \times 10^3$  and  $2 \times 10^3 \pm 1.01 \times 10^3$  CFU/cm<sup>2</sup>; respectively; from brisket region. From rump region such values were  $15 \times 10^4 \pm 1.4 \times 10^4$ ;  $11 \times 10^4 \pm 1.09 \times 10^4$ ;  $11 \times 10^2 \pm 1.01 \times 10^2$ ;  $4 \times 10^2 \pm 0.1 \times 10^2$ ;  $17 \times 10^3 \pm 1.1 \times 10^3$   $1.2 \times 10^4 \pm 0.09 \times 10^4$  and  $3.3 \times 10^4 \pm 0.9 \times 10^3$ ; CFU/Cm<sup>2</sup>. While from thin flank were  $18 \times 10^4 \pm 1.3 \times 10^4$ ;  $13 \times 10^4 \pm 1.1 \times 10^4$ ;  $18 \times 10^3 \pm 1.06 \times 10^3$ ;  $4 \times 10^2 \pm 0.13 \times 10^2$ ;  $7 \times 10^3 \pm 1.06 \times 10^3$ ;  $1.7 \times 10^3 \pm 0.02 \times 10^3$ ;  $1 \times 10^3 \pm 0.001 \times 10^3$ ; respectively; for samples collected from Kafer – El – Shiekh abattoir . Concerning El Mahaella El-Kubera abattoir the results in table (4; 5; 6) revealed that; the mean value  $\pm$  S.E for *TAPC*; *Psychrotrophic* count; *Coliform* count; *E.coli* count *Staphylococcus aureus* count and *Mould* and *Yeast* count from brisket region were  $17 \times 10^4 \pm 1.03 \times 10^4$  ;  $18 \times 10^3 \pm 1.11 \times 10^3$ ;  $9 \times 10^3 \pm 1.04 \times 10^3$ ;  $5 \times 10^2 \pm 1.06 \times 10^2$ ;  $2.7 \times 10^3 \pm 1.2 \times 10^3$  and  $2.3 \times 10^5 \pm 1.12 \times 10^5$  and  $42 \times 10^3 \pm 1.07 \times 10^3$  CFU/ Cm<sup>2</sup>; respectively. While from rump region the mean value were;  $22 \times 10^4 \pm 1.1 \times 10^4$ ;  $17 \times 10^3 \pm 1.02 \times 10^3$  ;  $17 \times 10^3 \pm 1.2 \times 10^3$ ;  $7 \times 10^2 \pm 1.08 \times 10^2$ ;  $6 \times 10^4 \pm 1.1 \times 10^4$  and  $1.5 \times 10^3 \pm 1.11 \times 10^3$  and  $2 \times 10^3 \pm 1.04 \times 10^3$  CFU/ Cm<sup>2</sup>; respectively. From thin flank the mean counts were  $18 \times 10^4 \pm 1.05 \times 10^4$ ;  $15 \times 10^3 \pm 1.04 \times 10^3$ ;  $8 \times 10^3 \pm 1.11 \times 10^3$ ;  $4 \times 10^2 \pm 1.1 \times 10^2$ ;  $3.2 \times 10^4 \pm 1.06 \times 10^4$ ; and  $8 \times 10^3 \pm 1.04 \times 10^3$ ,  $1 \times 10^5 \pm 1.06 \times 10^5$  CFU/Cm<sup>2</sup>; respectively; Also the results in tables (7;8;9;10) there is no variance; concerning the area of sampling we noticed that the variance in results did not revealed significance variance between each abattoir.

Moreover; the difference between regions nearly equilibrium. So this



revealed that about traditional abattoir the degree of hygiene was nearly similar and the same source of contamination and environmental condition in the abattoirs were nearly similar. Also the slaughtering steps from first step till the end step was the same degree. This agreement with that reported by *Ingram and Reports (1976); Roberts et al. (1980), Prasvska et al. (1991), Widders et al. (1995), Hudson et al. (1996); Dorso and Siragusa (1998); Gill et al. (1998); Gill et al. (1998),; Gill et al. (1998); Gill and Baker (1998); Jericho et al. (1998); Vanderlinde et al. (1998); Brown et al. (2000); Murray et al. (2001); Phillips et al. (2001)*. It was recommended that improvement of the HACCP system in all these abattoir. Also automatic steps of slaughter using modern machens must be applied . From the public health standpoint , isolation of *E.coli* true faecal type and the identified strains of high risk for consumer and is very important indication the faecal pollution for the carcasses . While *Staphylococcus aureus* isolation indicative for very bad handling of carcasses slaughtering process . Moreover for consumer it is of high risk on consumer Where it causing *Staphylococcus aureus* intoxication.

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## تقييم الأداء الصحي لذبائح الأبقار عند تجهيزها

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أجريت هذه الدراسة على (20) مسحة من كل منطقة القص الكفل أو الردف وجانب الفخذ الرقيق من (60) ذبيحة من الأبقار المذبوحة بمجزر كفر الشيخ وكذلك عشرون مسحة من نفس المناطق الثلاث من الذبيحة للأبقار المذبوحة بمجزر المحلة الكبرى (60) ذبيحة. وقد أسفرت النتائج عن الآتى:-

متوسط العدد الكلى للميكروبات  $4 \times 10^4 \pm 1.3 \times 10^4$  ومتوسط العد الكلى للميكروبات المحبة للبرودة  $4 \times 10^4 \pm 1.4 \times 10^4$  وميكروبات القولون  $2 \times 10^2 \pm 1.2 \times 10^2$  ومتوسط العدد الكلى للميكروبات العنقودي الذهبى  $12 \times 10^2 \pm 0.3 \times 10^3$  ومتوسط العدد الكلى الشريشياكولاي  $8 \times 10^2 \pm 0.3 \times 10^2$  وكان متوسط العدد الكلى للفطريات  $1.4 \times 10^3 \pm 1.09 \times 10^3$  ومتوسط العدد الكلى للخمائر  $2 \times 10^3 \pm 1.01 \times 10^3$  كولونى لكل سنتيمتر مربع لمنطقة القص فى الأبقار المذبوحة بمجزر كفر الشيخ. وكان متوسط العدد الكلى للميكروبات لمنطقة الكفل ومنطقة الفخذ الرقيق  $15 \times 10^4 \pm 1.4 \times 10^4$  و  $18 \times 10^4 \pm 1.3 \times 10^4$  وكان متوسط العدد الكلى للميكروبات المحبة للبرودة  $11 \times 10^4 \pm 1.09 \times 10^4$  و  $13 \times 10^4 \pm 1.1 \times 10^4$  وكان متوسط العدد الكلى لميكروبات القولون  $11 \times 10^2 \pm 1.01 \times 10^2$  و  $18 \times 10^3 \pm 1.06 \times 10^3$  وكان متوسط عدد ميكروبات الشيرشيا القولونية  $4 \times 10^2 \pm 0.1 \times 10^2$  و  $4 \times 10^2 \pm 0.13 \times 10^2$  وكان متوسط العدد الكلى للميكروب العنقودي الذهبى  $17 \times 10^3 \pm 1.1 \times 10^3$  و  $7 \times 10^3 \pm 1.06 \times 10^3$  ومتوسط العدد الكلى للفطريات  $1.2 \times 10^4 \pm 0.09 \times 10^4$  و  $1.7 \times 10^3 \pm 1.06 \times 10^3$  ومتوسط العدد الكلى للخمائر  $3.3 \times 10^4 \pm 0.9 \times 10^3$  و  $1 \times 10^3 \pm 0.01 \times 10^3$  كولونى لكل سنتيمتر مربع لمجزر كفر الشيخ أما بالنسبة لمجزر المحلة الكبرى فقد كان متوسط العدد الكلى للميكروبات والميكروبات المحبة للبرود وميكروب القولون وميكروب الشريشياكولاي وميكروب العنقود الذهبى والفطريات والخمائر فى كلا من منطقة القص والكفل والفخذ الرقيق على التوالى كالأتى :-

$10 \times 1.05 \pm 4 10 \times 18$  و  $4 10 \times 1.1 \pm 4 10 \times 22$  و  $4 10 \times 1.03 \pm 4 10 \times 17$   
 $\times 1.04 \pm 3 10 \times 15$  و  $3 10 \times 1.02 \pm 3 10 \times 17$  و  $3 10 \times 1.011 \pm 3 10 \times 18$  و  $4$   
 $10 \times 1.11 \pm 3 10 \times 8$  و  $3 10 \times 1.2 \pm 3 10 \times 17$  و  $3 10 \times 1.04 \pm 3 10 \times 9$  و  $3 10$   
 $2.7$  و  $2 10 \times 1.1 \pm 2 10 \times 4$  و  $2 10 \times 1.08 \pm 2 10 \times 7$  و  $2 10 \times 1.06 \pm 2 10 \times 5$  و  $3$   
 $\times 2.3$  و  $4 10 \times 1.06 \pm 4 10 \times 3.02$  و  $4 10 \times 1.1 \pm 4 10 \times 6$  و  $3 10 \times 1.2 \pm 3 10 \times$   
 $\times 42$  و  $3 10 \times 1.04 \pm 3 10 \times 8$  و  $3 10 \times 1.11 \pm 3 10 \times 1.5$  و  $5 10 \times 1.12 \pm 5 10$   
 $5 10 \times 1.06 \pm 5 10 \times 1$  و  $3 10 \times 1.04 \pm 3 10 \times 2$  و  $3 10 \times 1.07 \pm 3 10$

كولوني فورمينج يونت لكل سنتيمتر مربع وقد تم أيضا فحص نسبة ميكروب الشيريشيا القولونية  
في العينات التي تم فحصها وكانت كالأتي 35% و 10% و 40% لمناطق الغربية في منطقة الفحص  
ولكفل والفخذ الرقيق على التوالي. أما بالنسبة لكفر الشيخ فكان نسبة تواجد ميكروب الشيريشياكولاي  
45% و 15% و 55% لمنطقة القص والكفل والفخذ الرقيق كما تم تصنيف ميكروب الشيريشياكولاي  
سيروولوجيا وكانت النتائج كالأتي :-

O55:K59 (B5) EPEC 20% O86:K61 (B7) EPEC, 10%، O119:K69  
(B19) EPEC 35% O124:K72(B17) EIEC, 5% ،O126:K71(B16) EIEC 25%.

على التوالي بالنسبة لمجزر كفر الشيخ وكانت في عينات المحلة الكبرى بنسبة 40% و 20%

و 25% و 30% و 55% على التوالي.