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# Differential Microbiological Quality on Marketed Frozen Turkey Breast and Thigh Meat

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**Abstract**

TURKEY meat has a high nutritional value due to its abundance of vitamins, protein, and other growth-promoting ingredients. In this study, 100 turkey samples were gathered from various supermarkets across the governorate of Menofia, Egypt. Microbiological assessment of thigh and breast samples was done by measuring the aerobic plate count (APC), coliforms, *Escherichia coli*, *Salmonella*, and *Staphylococcus aureus* as well as yeast and mould count. Concerning the turkey meat samples, the mean total aerobic count values were 4.01 ± 0.21 $log_{10}$ CFU/g in the thigh and 3.19 ± 0.13 $log^{10}$ CFU/g in the breast. The thigh and breast had mean values of 3.21 ± 0.16 $log^{10}$ CFU/g and 2.02 ± 0.11 $log^{10}$ CFU/g, respectively, for total coliforms. The *Staphylococcus aureus* count was 2.11 ± 0.09 $log^{10}$ CFU/g in the thigh and 1.85 ± 0.08 $log_{10}$ CFU/g in the breast. While mould and yeast counts were 3.27 ± 0.11 $log^{10}$ CFU/g in the thigh and 2.55 ± 0.04 $log^{10}$ CFU/g in the breast. The incidence of *E. coli* was 42% in thigh samples and 26% in breast samples. *Salmonella* incidence represented 18% in thigh samples and 10% in breast samples. While the mould and yeast were 22% in thigh samples and 14% in breast samples. In conclusion, food-borne pathogens were found in most samples. These pathogens were higher in the thigh than those in breast samples. Consequently, strict hygiene measures should be conducted during the slaughtering, handling, and transporting of turkey meat.

**Keywords:** Meat quality, *E coli*, *Salmonella*, *Staph aureus*, Coliform.

## Introduction

Turkey's meat consumption has risen in recent years due to its high protein content and low-fat content (1.21%), which is lower than chicken's fat content [1]. Further, turkey meat is favoured over beef meat when it comes to animal-based foods due to its high nutritive value and lower cost than beef [2]. The B - group vitamins thiamin (B1), riboflavin (B2), niacin (B3), and pyridoxine (B6), as well as the minerals calcium, phosphorus, and potassium, are abundant in turkey flesh [3].

While *Salmonella* and *Staphylococcus aureus* outbreaks have been linked to turkey meat [4], whereas the environment in which animals are raised, their transportation, processing, slaughter, and storage all have an impact on the microbial contamination of their meat [5-7]. The number of total aerobic plates serves as a measure of the bacterial population in the sample [8]. The sanitary procedures used during processing are provided by the total aerobic plate count. This makes it the most trustworthy technique for determining the hygienic standards of appropriate food processing, storage, and marketing [9]. However, it cannot identify distinct species of bacteria [10].

*Escherichia coli* is a crucial marker for fecal contamination, and its presence in chicken meat

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indicates poor sanitation practices and could lead to food poisoning in human [11]. *Salmonella* is considered an etiological agent of food borne outbreaks worldwide [12, 13]. Dust, food handlers, pets, insects, rodents, birds, and the air are the main sources of *Salmonella* [14]. Additionally, *Staphylococcus aureus* was listed as one of the major food-borne illnesses on the globe, ranking third [15]. Chicken skin frequently harbors *Staphylococci* [16]. Some species of the *Staphylococcus* genera—like *S. aureus*—are known to be pathogenic, whereas other species are thought to be commensal [17]. The existence of *S. aureus* in poultry meat is indicative of unsanitary practices during slaughter, contamination via contaminated blades, the skin or intestinal contents of the corpse, and other sources [18]. When there are a lot of bacteria contamination, it might undergo changes that make it unsafe for human eating or potentially dangerous [19]. The current study aims to estimate the microbiological evaluation of marketed turkey breast and thigh meat in Menofia governorate, Egypt.

## Material and Methods

In this study turkey's breast and thigh samples were collected from different supermarkets in Menofia governorate, Egypt. These samples were examined microbiologically for validation of their effects on consumers' health. The microbiological examination focused on the microorganisms which have public health importance and could be used as hygienic quality indicators. The APC, coliforms, *E. coli*, *Salmonella*, *Staphylococcus aureus*, yeast and mould were detected in the collected samples.

**Sample collection**: A total of 100 samples (50 from thigh and 50 from breast) of turkey meat were collected, under aseptic conditions, from different supermarkets in Menofia governorate. Each sample was placed in a sterile stomacher bag, labeled, and transported in an ice box to the laboratory. On arrival, the samples were analyzed immediately.

### Microbiological analysis

The microbiological analysis was done according to Basak and Shetty [8]. A portion of 25 g of each sample is cut aseptically, then blended carefully using a stomacher (Seward/England), and then added to an Erlenmeyer flask containing 225 ml of sterile physiological saline, then a series of tenfold dilutions ranging up to $10^6$ were prepared. The microbiological analysis was focused on the estimation of the total aerobic plate count (APC), total coliforms, *Escherichia coli*, *Salmonella*, *Staphylococcus aureus*, and yeast and mould counts. As well as *Escherichia coli* and *Salmonella* serology were made.

### Determination of total aerobic plate count (APC):

This was completed by applying the technique of deep seeding on the Plate Count Agar (PCA) (Acumedia/UK) following Foods [20]. in which, 1 ml from the previously prepared solution was transferred aseptically into a sterile petri dish, and then 15 ml of PCA was added to the inoculum. Then after agar solidification, they were incubated at 37 °C for 24 hours. The Petri dishes containing 30-300 colonies were used to count the total colony number per gram of the sample.

### Determination of coliform count

The Violet Red Bile Lactose Agar (VRBL) medium (HIMEDIA/Indin) was utilized, and the same protocols as in the APC were followed Foods [20]. The counting of the pink-red colonies larger than 0.5 mm in diameter was done after a 24-hour incubation period at 37 °C. The number of coliforms per gram of sample was calculated by multiplying the number of counted colonies by the dilution factor.

### Detection of *Escherichia coli*:

It was indicated by the metallic reflection and the green color of the colonies on the Eosin Methylene Blue (EMB) plating medium (HIMEDIA /Indin). To identify *E. coli*, the IMViC (indole production, methyl red, Voges Proskauer, citrate utilization) tests were performed on representative colonies.

### Detection of *Salmonella* species:

The red colonies with or without black centers on XLD agar (Biolife/Italia) were speculated as *salmonella* species and identified morphologically and biochemically according to Quinn et al., [21].

Morphological identification:
*Microscopical examination*

Films of pure suspected cultures were stained with Gram's stain and examined microscopically. Gram-negative, medium-sized, stained evenly bacilli were suspected to be Salmonellae.

*Motility test:*

The motility medium was inoculated by the stabbing technique to a depth of 5 mm and then incubated at 37℃ for 24 hours. A circular growth from the line of stabbing represented a positive motility result.

Biochemical identification
*Indole test:*

One ml of ethyl ether was added to 48 hours culture incubated at 37°C in 1% peptone water. The tubes were vigorously shaken and allowed to stand until ether rose to the surface. To each tube, 0.5 ml of the Kovac's reagent was trickled down the side of the tube. The positive reaction to the indole test (formation of a red ring at the surface layer after 10 minutes) wasn't noticed as *salmonellae* are indole negative.

*Methyl Red Test*

Five ml buffered glucose broth tubes were inoculated with pure culture and incubated at 37°C for 24 hours. To each tube, 5 drops of Methyl Red reagent were added. The development of a red color was considered a positive reaction of *salmonellae* to methyl red.

*Voges – Praskauer test*

In a test tube, 1 ml was taken from 48 48-hour culture incubated at 37°C in 5 ml buffered glucose phosphate broth, and 0.6 ml of alcoholic solution of alpha–naphthol and 0.2 ml of 4% potassium hydroxide solution were added. The tubes were standing for 24 hours. The *salmonellae* showed a negative reaction because the pink coloration of the mixture wasn't recorded.

*Citrate utilization test*

Slants and butts of Simmon citrate agar tubes were stabbed from pure cultures and incubated at 37°C for 48 hours. The blue coloration was noticed indicating utilization of citrate.

*Urease test*

Christensen medium was inoculated with suspected isolates and incubated at 37°C for 24 hours. The pink colour that denoted hydrolysis of urea wasn't noticed. These negative tubes were re-examined after further incubation for 24 hours for confirmation of our result.

*Hydrogen sulphide production test*

On Triple Sugar Iron (TSI) agar, isolated organisms were stabbed into the bottom of the butt with a needle, and then it was drawn over the slant, for the production of sufficient surface growth. The inoculated tubes were incubated at 37°C for 24 hours. The positive reaction to hydrogen sulphide production was noted by blacking the medium.

*Gelatin hydrolysis test:*

Nutrient gelatin stab cultures were grown at room temperature and observed daily after cooling to about 18°C. The gelatin liquefaction wasn't recognized.

**Determination of *Staphylococcus aureus* count:**

It was isolated and enumerated on Baird Parker (BP) agar (NEOGEN/UK). The black, shiny colonies with halo zones around them were picked up for morphological examination and biochemical identification according to Moraes et al. 2021 [22]. The colonies were tested for coagulase production and catalase activity for presumptive identification.

**Biochemical identification of *Staphylococcus aureus***

*Oxidase test:*

The oxidase test was done by streaking the pure culture onto filter paper moistened with an oxidase reagent. The test is positive if the color turns to mauve, violet, or deep purple within 10 seconds. *Staphylococcus aureus* gives negative results.

*Catalase activity test*

The purified suspected colonies were picked up with a sterile loop and transferred to the surface of the glass slide. Accurately, one or two drops of hydrogen peroxide solution (3%) were added then the cover slide was applied. The rapid appearance of gas bubbles was considered a positive reaction. *Staphylococcus aureus* gives positive results.

*Coagulase test*

Accurately, 0.1 ml from BHI (brain heart infusion) broth cultures were transferred to Wassermann tubes containing 0.3 ml of sterile reconstituted rabbit plasma (or human plasma). Inoculated tubes were incubated at 37℃ for 24 hours. The tubes were examined for clotting (fibrin clot formation). The extent of the coagulase reaction was recorded. Tubes were left at room temperature for an additional 20 hours and then re-examined for clot formation. The extent of coagulation of the plasma was reported after 4 and 24 hours. *Staphylococcus aureus* gives positive results.

**Determination of yeast and mould**

They were determined following the instructions of Foods [20]. One ml from the original dilution was streaked onto Sabouraud's dextrose agar (Biolife /Italia), incubated at 25c, and examined daily for 7 days. The numbers of colonies (creamy white yellow colony) were counted.

**Serological identification of *E. coli*:**

The isolates were serologically identified according to Kok et al. [23] by using rapid diagnostic *E.coli* antisera sets (DIFCO Laboratories, Detroit Michigan 48232-7058, USA) for diagnosis of the Enteropathogenic types.

Two separate drops of saline were put on a glass slide and a portion of the colony from the suspected culture was emulsified with the saline solution to give a smooth fairly dense suspension. This suspension is divided into two parts. In the first part (control) one loopful of saline was added and mixed. For the second part of the suspension, one loopful of undiluted antiserum was added and titled back and forward for one minute.

Agglutination was observed using indirect lighting over a dark background. When a colony gave a strongly positive agglutination with one of the pools of polyvalent serum, a further portion of it was inoculated onto a nutrient agar slant and incubated at 37°C for 24 hours to grow as a culture for testing with mono-valent sera. A heavy suspension of bacteria from each slope culture was prepared in saline, and slide agglutination tests were performed with the diagnostic sera to identify the O-antigen. The diagnostic *E.coli* antisera sets used for identification include the following sets:

Set 1: O- antisera:

Polyvalent antisera 1: O1, O26, O86a, O111, O119, O127a and O128.

Polyvalent antisera 2: O44, O55, O125, O126, O146 and O166.

Polyvalent antisera 3: O18, O114, O142, O151, O157 and O158.

Polyvalent antisera 4: O2, O6, O27, O78, O148, O159 and O168

Set 2: H- antisera:

H2, H4, H6, H7, H11, H18 and H21

**Serological identification of *Salmonellae*:**

Serological identification of *Salmonellae* was carried out according to the Kauffman – White scheme [24] for the determination of Somatic (O) and flagellar (H) antigens using Salmonella antiserum (DENKA SEIKEN Co., Japan)

**Identification of Somatic (O) antigen "Slide agglutination test":**

A dense suspension of the organism was prepared by suspending growth in 0.5 ml of saline solution. Using a wax pencil, 2 circles about 1 cm in diameter on a microscopic slide were marked. One drop of *Salmonella* Polyvalent "O" antiserum was put in one of the marked circles and one drop of the saline solution was put in the other circle (negative control). Using a clean dropper, one drop of bacterial suspension (0.05 ml) was transferred into each of the circles and mixed thoroughly by gently racking for 1-2 minutes (excessive evaporation was avoided). A positive reaction was adopted by rapid and complete agglutination. A delayed or partial agglutination should be considered negative. The *Salmonella* group and the other somatic components of the group were also identified using by using separate "O" antiserum factors.

**Identification of Flagellar (H) antigen "Tube agglutination test":**

Determination of Flagellar (H) antigens was carried out by using Polyvalent H antiserum for both phase 1 and phase 2 to determine the complete antigenic formula of the isolates. A loopful of H antiserum was added to one drop of the bacterial suspension in the small agglutinating tube and mixed gently by a sterile loop. The agglutination tube was gently agitated for one minute and observed for agglutination under normal lighting conditions.

**Statistical analysis**

The results of bacterial counts were expressed as mean ± SD ($log_{10}$ CFU/g). The significance difference ($P<0.05$) between the means is calculated using a student t-test according to [25].

**Results**

The obtained results of APC in thigh and breast were 4.01 ± 0.21 $log_{10}$ CFU/g, with counts in the range 2.55–4.15 $log_{10}$ CFU/g in thigh and in breast 3.19±0.13 $log_{10}$ CFU/g with range 2.01–3.84 $log_{10}$ CFU/g (table 1). While the coliform counts were 3.21 ± 0.16 $log_{10}$ CFU/g, with counts in the range 2.71–3.48 $log_{10}$ CFU/g in the thigh and 2.02 ± 0.11 $log_{10}$ CFU/g in the breast, with range 1.60–2.31 $log_{10}$ CFU/g (Table 2). The *Staphylococcus aureus* counts were 2.11 ± 0.09 $log_{10}$ CFU/g, with counts in the range 1.71–2.23 $log_{10}$ CFU/g in the thigh and 1.85 ±0.08 $log_{10}$ CFU/g with a range of 1.50–2.02 $log_{10}$ CFU/g in the breast (Table 3).

The mould and yeast counts were 3.27 ± 0.11 $log_{10}$ CFU/g, with a count ranged between 2.46 to 3.92 $log_{10}$ CFU/g in the thigh and 2.55 ± 0.04 $log_{10}$ CFU/g with a range of 2.11–2.98 $log_{10}$ CFU/g in the breast (table 4). The incidence of mould and yeast was 22% in the thigh and 14% in the breast (table 5). The incidence of *E. coli* was 42% in the thigh and 26% in the breast. Additionally, the incidence of *salmonellae* was 18% in the thigh and 10% in the breast (table 5).

**Serotyping**

The serotyping of *E. coli* strains was detected in the examined samples. The incidence of enteroinvasive *E. coli* (EIEC), O124 strain, was 2% in thigh samples only. There were three strains of Enterohaemorrhagic *E. coli* (EHEC); the O26:H11 strain incidence was 2% in both thigh and breast samples, the O111:H4 strain with an incidence of 2% in breast samples only, and O91:H21 strain with incidence 4% in both thigh and breast samples. The incidence of enteropathogenic *E. coli*. (EPEC), O146:H21 strain was 4% in thigh samples and 2% in breast samples (Table 6).

*Salmonella* Serotyping was detected in the examined samples of the thigh and breast of turkey and the incidences of their serotypes were calculated. The incidence of *S. Kentucky* was 2% in both thigh and breast samples. The incidence of *S. Heidelberg* was 4% in thigh and 2% in breast samples. The incidence of *S. Typhimurium* was 2% in thigh samples only (Table 7).

**Discussion**

In this study, frozen marketed turkey breast and thigh meat samples were examined for microbiological quality. Our results indicated a higher level of APC, coliforms, *Staphylococcus aureus*, *Salmonell, E. coli*., and mould and yeast in the thigh than in the breast of the turkey samples. This suggests that the turkey thigh samples were more susceptible to microbial contamination than the turkey breast samples. The presence of such pathogens may have been present because of improper handling or contamination of meat samples [26]. Processing, distribution, and storage conditions, in addition to the physiological state of the animals at slaughter, all have an impact on the bacterial load on poultry meat [27].

It should be mentioned that mesophile counts of 8–9 $\log_{10}$ CFU/g are necessary for poultry to deteriorate [28]. These populations were not reached in the present study. The overall count of coliforms in turkey flesh is typically used as a measure of sanitation [29]. These organisms are referred to as indicators because their existence suggests that the meat samples were exposed to potential pathogenic organism-introducing environments [30].

In Morocco, Jaber, et al. [5] found a higher total APC in turkey meat than in our study. However, our result resembled the result obtained by Augustyńska-Prejsnar, et al. [31], who found that the total APC is 4.25 ± 0.07 log CFU/g. The load of coliforms in our study is lower than that reported by Morshdy, et al. [32] in chicken meat products (3.37-3.83 $\log_{10}$ CFU /g) in Zagazig City, Egypt. The obtained results in *Staphylococcus aureus* counts are consistent with Martínez-Laorden, et al. [33], who found 2.52 log CFU/g. however, Jaber, et al. [34] found a higher *Staphylococcus aureus* counts than our study. The results of this investigation showed that the mould and yeast were lower than those of Vural, et al. [35], who reported an 88.18% rate.

*Escherichia coli* is a hygienic indicator; its presence in turkey flesh indicates intestinal pathogenicity and raises the possibility of consumer contamination. our results for the prevalence of *E. coli* are compatible with those found by Martínez-Laorden, et al. [33] (45.4% in turkey meat). Our results are less than those obtained by Díaz-Jiménez, et al. [36] (84%), Patyal, et al. [37] (68%), Jaber, et al. [5] (67.8%) and Abdellah, et al. [38] (83%). Our result was largely higher than that found by Vural, et al. [35] (39.09%) and Iroha, et a. [39] **(**2%).

*Salmonella* is significant in the veterinary field and the medical plan, due to the high occurrence in consumers and the economic losses resulting from animal diseases. Thus, gastroenteritis is typically caused by typhoid fever and food-borne illnesses caused by *Salmonella* [40]. Accurately, 33% of food-borne illnesses are caused by *Salmonella* [40]. Many different food items, including meat and especially chicken, meat products, eggs, and dairy products, maybe the source of human infection due to the wide range of animals that can harbor *Salmonella* [41]. If a meal that is intended for widespread distribution is contaminated, salmonellosis can result in significant outbreaks that could even affect the entire country [5].

The rate of contamination by *Salmonella* is variable according to studies of Bennani, et al. [42] who have reported a rate of 13% of positive samples of *Salmonella* sp. on samples of poultry meat.

However, Beli, et al. [43] have revealed a low prevalence of *Salmonella* in turkey meat in Albania (8.2%). In Ireland, Jordan, et al. [44] have found a rate of 3.1%.

Turkish Food Codex Microbiological Criteria Regulation [45] stipulates that there cannot be any *Salmonella* spp. in 25 grams of raw poultry flesh, and if there is, they are not fit for human consumption.

Although most *E. coli* isolates are normal human colonic flora, some other strains are highly toxic [46]. Enteroinvasive *E. coli*, Enterohaemorrhagic *E. coli*, and enteropathogenic *E. coli* strains, which were checked in this study, can cause enteric disease upon human consumption of contaminated meat [47]. EIEC strain was found in thigh samples only. However, EHEC and EIEC strains were found in both thigh and breast samples. These results indicate higher contamination of thigh samples than breast samples.

*Salmonella* is a public health important. The serotypes of *Salmonellae* differ in their importance for public health. The typhoidal serotype remains the major public health threat, because of its antimicrobial resistance [48]. In our results, three serotypes of Salmonellae were recognized in turkey meat (*S. Typhimurium*, *S. Heidelberg*, and *S. Kentucky*). These serotypes are from non-typhoidal *Salmonellae*. They are a prominent worldwide cause of bacterial gastroenteritis [49]. Following our results, *Salmonella* serotypes isolated from poultry meat in Turkey were higher in thigh samples than breast samples [50]. Therefore, more attention should be paid to hygienic measures during cleaning turkey meat in Menofia Governorate, Egypt with more attention to thigh meat.

## Conclusion

We could conclude that there were APC, Coliforms, *E. coli*, *Salmonella*, *Staphylococcus*, and mould and yeast contamination in the examined turkey meat samples. The thigh samples showed higher contamination than the breast samples. This indicates that breast meat is better than thigh meat concerning their microbiological quality.

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*Declaration of Conflict of Interest*

The authors declare that there is no conflict of interest.

*Ethical of approval*

This study follows the ethics guidelines of the Faculty of Veterinary Medicine, Benha University, Egypt (ethics approval number; 49/11/2023).

**TABLE 1. Statistical analysis of Aerobic plate count ($log_{10}$ CFU/g) in the examined samples of thigh and breast of turkey (n=50)**

| Products | Min. ($log_{10}$ CFU/g) | Max. ($log_{10}$ CFU/g) | Mean ± S.E* ($log_{10}$ CFU/g) | P value* |
|---|---|---|---|---|
| **Thigh** | 2.55 | 4.15 | $4.01 \pm 0.21^{a}$ | 0.02 |
| **Breast** | 2.01 | 3.84 | $3.19 \pm 0.13^{b}$ | |

*Mean values of logarithmic count for different products with different superscript letters in the same rows are significantly different at (P<0.05).

**TABLE 2. Statistical analysis of Coliform count ($log_{10}$ CFU/g) in the examined samples of thigh and breast of turkey (n=50)**

| Products | Min. (log10 CFU/g) | Max. (log10 CFU/g) | Mean ± S.E* (log10 CFU/g) | P value* |
|---|---|---|---|---|
| **Thigh** | 2.71 | 3.48 | $3.21 \pm 0.16^{a}$ | 0.02 |
| **Breast** | 1.60 | 2.31 | $2.02 \pm 0.11^{b}$ | |

*Mean values of logarithmic count for different products with different superscript letters in the same rows are significantly different at (P<0.05).

**TABLE 3. Statistical analysis of *Staphylococcus aureus* count ($log_{10}$ CFU/g) in the examined samples of thigh and breast of turkey (n=50)**

| Products | Min. (log10 CFU/g) | Max. (log10 CFU/g) | Mean ± S.E* (log10 CFU/g) | P value* |
|---|---|---|---|---|
| **Thigh** | 1.71 | 2.23 | $2.11 \pm 0.09^{a}$ | 0.01 |
| **Breast** | 1.50 | 2.02 | $1.85 \pm 0.08^{b}$ | |

*Mean values of logarithmic count for different products with different superscript letters in the same rows are significantly different at (P<0.05).

**TABLE 4. Statistical analysis of mould & yeast count ($log_{10}$ CFU/g) in the examined samples of thigh and breast of turkey (n=50)**

| Products | Min. ($log_{10}$ CFU/g) | Max. ($log_{10}$ CFU/g) | Mean ± S.E* ($log_{10}$ CFU/g) | P value* |
|---|---|---|---|---|
| **Thigh** | 2.46 | 3.92 | $3.27 \pm 0.11^{a}$ | 0.02 |
| **Breast** | 2.11 | 2.98 | $2.55 \pm 0.04^{b}$ | |

*Mean values of logarithmic count for different products with different superscript letters in the same rows are significantly different at (P<0.05).

**TABLE 5. The incidence of *E. coli*, Salmonellae and mould &yeast in the examined samples of thigh and breast of turkey (n=50).**

| Products | Thigh | | Breast | |
|---|---|---|---|---|
| | No. | % | No. | % |
| ***E. coli*** | 21 | 42 | 13 | 26 |
| **Salmonellae** | 9 | 18 | 5 | 10 |
| **Mould & Yeast** | 11 | 22 | 7 | 14 |

**TABLE 6. Incidence and serotyping of *E. coli* strains which detected in the examined samples of thigh and breast of turkey (n=50)**

| Sample<br>*E. coli* strains | Thigh | | Breast | | Strain Characteristics |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| O124 | 1 | 2 | - | - | EIEC |
| O26 : H11 | 1 | 2 | 1 | 2 | EHEC |
| O111 : H4 | - | - | 1 | 2 | EHEC |
| O146 : H21 | 2 | 4 | 1 | 2 | EPEC |
| O91 : H21 | 2 | 4 | 2 | 4 | EHEC |
| Total | 6 | 12 | 5 | 10 | |

% is calculated in relation to total examined samples
EIEC = Enteroinvasive *E. coli*, EHEC= Enterohaemorrhagic *E. coli*, and EPEC= Enteropathogenic *E. coli*.

**TABLE 7. Incidence and serotyping of *Salmonellae* which detected in the examined samples of thigh and breast of turkey (n=50)**

| Sample/<br>Salmonella | Thigh | | Breast | | Groups | Antigenic Structure | |
|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | | O | H |
| S. Kentuckey | 1 | 2 | 1 | 2 | C3 | 8, 20 | i : Z6 |
| S. Heidelberg | 2 | 4 | 1 | 2 | B | 4, 5, 12 | r: 1, 2 |
| S. Typhimurium | 1 | 2 | - | - | B | 1, 4, 5, 12 | i : 1,2 |
| Total | 4 | 8 | 2 | 4 | | | |

% is calculated in relation to total examined samples


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## دراسة ميكروبيولوجية تفاضلية على صدر وفخذ لحم الديك الرومي المجمد المعروض بالأسواق

**رانيا عاطف الخولي[1] ، نـهلة أحمد شوقي أبوالروس[2] ، مني نصر عبدالنعيم حسين[3] و فهيم عزيز الدين محمد شلتوت[1]**
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يتمتع لحم الديك الرومي بقيمة غذائية عالية بسبب وفرة الفيتامينات والبروتينات وغيرها من المكونات المعززة للنمو. في هذه الدراسة تم تجميع 100 عينة من الديك الرومي من العديد من محلات السوبر ماركت في جميع أنحاء محافظة المنوفية، مصر. تم إجراء التقييم الميكروبيولوجي لعينات الفخذ والصدر عن طريق قياس العدد الكلي للبكتيريا (APC)، وعدد القولونيات (coliforms)، و الإشريكية القولونية (*E. coli*)، والسالمونيلا، المكورات العنقودية *staph. aureus*)، والخميرة والعفن. وفقًا لفحص الجودة الميكروبيولوجية لعينات لحم الديك الرومي، كان متوسط قيم العدد الكلي للبكتريا 4.01 ± 0.21 $\log_{10}$ CFU/g في الفخذ و3.19 ± 0.13 $\log_{10}$ CFU/g في الصدر. كان للفخذ والصدر قيم متوسطة تبلغ 3.21 ± 0.16 $\log_{10}$ CFU / g و 2.02 ± 0.11 $\log_{10}$ CFU / g، على التوالي، بالنسبة لمجموع القولونيات. كان عدد المكورات العنقودية 2.11 ± 0.09 $\log_{10}$ CFU / g في الفخذ و 1.85 ± 0.08 $\log_{10}$ CFU / g في الصدر. بينما بلغ معدل العفن والخميرة 3.27 ± 0.11 $\log_{10}$ CFU/g في الفخذ و2.55 ± 0.04 $\log_{10}$ CFU/g في الصدر. وكانت نسبة الإصابة بالإشريكية القولونية 42% في عينات الفخذ و26% في عينات الصدر. بلغت نسبة الإصابة بالسالمونيلا 18% في عينات الفخذ و10% في عينات الصدر. بينما بلغت نسبة العفن والخميرة 22% في عينات الفخذ و14% في عينات الصدر. في الختام، تم العثور على مسببات الأمراض التي تنتقل عن طريق الأغذية في معظم العينات. كانت مسببات الأمراض هذه أعلى في الفخذ منها في عينات الصدر. وبالتالي، ينبغي اتخاذ تدابير صحية صارمة أثناء ذبح وتداول ونقل لحم الديك الرومي.

**الكلمات الدالة:** جودة اللحوم ، الإشريكية القولونية ، السلمونيلا ، المكورات العنقودية ، القولونيات.