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MICROBIOLOGICAL QUALITY OF THE MOST CONSUMPTION FAST FOODS AVAILABLE IN QENA'S RESTAURANTS

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ABSTRACT

Samples of some fast foods were collected from different restaurants in Qena city during winter season (2007/2008) to investigate their microbiological quality. The questionnaire appeared that most common fast foods were: bean cake (tamia or flafel) sandwiches, liver sandwiches, koshari dishes, faba bean (medamis) sandwiches, hawawshi sandwiches, béchamel macaroni dishes, shawerma sandwiches, luncheon sandwiches and roasted kofta sandwiches. All investigated fast foods were contaminated by one or more of examined bacteria i.e: *Bacillus cereus*, *Shigella* spp., *Salmonella* spp., *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas* spp., while, fungi such as *Rhizops* spp. and *Pencillum* spp. were found in some tested samples.

Most of investigated samples tended to have some pathogenic count higher than the recommendation safety limit proposed by Egyptian Organization for Standardization and Quality Control (*EOSQC*), which means that those foods may be unsafe enough for human feeding. Thus, the consumption of fast foods outdoors should be limited and substituted with anther more healthy foods.

INTRODUCTION

Popular foods in Egypt are usually sold in carts, small shops and restaurants. These foods provide cheaply ready-to-eat food for human, whom eat away from homes. Consumption of fast foods has increased greatly among people. The attraction of eating fast food items may be makes the people gain weight and has bad affects on health due to their contamination (Shabayek and Saleh, 2006).

Approximately ten percent of the humans yearly may be suffering from food borne disease. These diseases are caused mostly by biological agents; bacteria, viruses, helminthes, and fungi (Kaferstin *et al.*, 1997). The most implicated foods were meat, milk, and eggs which were contaminated primarily by intestinal animal commensals as; *Salmonella* spp., *Campylobacter*, *E. coli* or secondarily by animals humans and environment during processing as; *Shigella* spp. and *Clostridium* spp. (Hoogkamp, 2003).

Some studies revealed that pathogenic bacteria such as; *Bacillus cereus*, *Salmonella* spp., *Staphylococcus aureus*, *Escherichia coli*, *Shigella* spp. and *Pseudomonas* spp., and some fungi as; *Rhizops* spp. and *Pencillum* spp. were isolated from fast foods. Accordingly, fast foods could be potential sources of food borne pathogens and it could be implicated in food borne disease outbreaks (Grazin and Olsen, 1997).

In Egypt, the preparation, handling, and distribution of fast foods in great amounts of food contributed to outbreak food borne diseases, so that

many studies have been undertaken during last period to assess the limit of outbreak food borne diseases (Rakha *et al.*, 1990).

There are many types of fast foods available in Qena's restaurants, those foods are usually consumed by great bulk of human and may be contaminated with a large number of microbes and make some diseases. Accordingly, the problem under investigation intends to shed light upon the microbiological examination of the most distributed fast foods for both their bacteriological and fungal qualities.

MATERIALS AND MEHODS

Materials:

- Ten unit of each fast food samples available on different shops and restaurants in Qena city were collected in ice box. All those samples were examined within 2 hours for their microbiological quality in winter season (2007/2008). The fast food samples and their contents were faba bean (medamis) sandwiches, bean cake (tamia or flafel) sandwiches, koshari dishes, béchamel macaroni dishes, shawerma sandwiches, hawawshi sandwiches, kofta sandwiches, liver sandwiches and luncheon sandwiches. All samples were collected in triplicate.
- Medias of Bacillus cereus, *Staph. Aureus*, *Pseudomonas* and total *fungal* counts were purchased from El- Badr, El-Hanasyia Company, Biolife Milan, Italy.
- Media of total aerobic bacterial plate count was purchased from El-Gomhoria Pharmaceutical Company, Cairo, Egypt.
- Media of *Shigella* spp., *Salmonella* spp. and *Escherichia coli* counts was purchased from Health Family Company, Cairo, Egypt.

Methods:

Preparation of samples:

Ten gram of each mixed samples were placed in a 250 cm^3 sterilized conical flask containing 90 cm^3 to make a dilution of 10^{-1}. Then, the flasks were shaken well for 10 minutes. Several dilutions from 10^{-1} to 10^{-10} were done using 0.1% peptone water.

Microbial count:

-Total aerobic plate counts of bacteria were determined using nutrient agar media.

-*Bacillus cereus* was determined using selective agar media (Phenol-Red-Egg-Yolk polymyxin) "*PREY*".

-The Xylose L-Lysine Desoxycholate (*XLD*) media was used for isolation of total *Shigella* spp., *Salmonella* spp., and *Escherichia coli* counts. Decentralization between the previous three types was done using the morphology and biochemical characters as described by the media sheet.

-The total *Staph. aureus* count was determined using Baird Parker Agar Base.

-*Pseudomonas* selective agar media was used for isolation of *Pseudomonas* spp.

-Total fungal count was determined using Potato Dextrose Agar media. Microscopic examination has been used for identification of different kinds of fungi.

Preparation of samples and microbiological examination were done according to *ICMSF* Bulletin (1987).

Statistical analysis:

Duncan Multiple Comparison to recognize the differences among each means of microbial count and their profiles in all the studied samples (El-Sherbeeny, 1995).

The method of statistical analysis was done using *SPSS* analysis without anguish version 12.0 for windows (Coakes, 2005).

RESULTS AND DISCUSSION

Sandwiches of tamia, liver, medamis, hawawshi, shawerma, luncheon and roasted kofta; koshari and béchamel macaroni dishes were the most consumable fast foods eaten outdoors by people in Qena city according to the data obtained from applied questionnaire (data not present in Tables). Accordingly, the current study aims to investigate the microbiological quality of the previous fast food samples.

Microbiological determination

1- Aerobic Plate Count (*APC*):-

Total count of bacteria is used as indicator for fast foods quality. The mean aerobic plate count (*APC*) is presented in Table (1). Data in Table (1) reveal that the examined samples had a high microbial value. Hawawshi sandwiches tended to have the highest mean values of *APC*; followed by liver, luncheon, and tamia with salad sandwiches. Even, significant differences have been observed among the previous samples. Ali and Spencer (1995) mentioned that holding meat products sandwiches for prolonged time after preparation and in temperature from 17 to 40°C may be a main source of contamination. On contrast, shawerma sandwiches had the lowest value among all the tested samples. It may be due to the high direct heat which shawerma faced during cooking. The statistical analysis showed that there were no significant differences among shawerma sandwiches, medamis sandwiches and koshari dishes. The mean of *APC* for koshari in this study was agree with the data published by Afifi and Hussein (2001). The low of bacteria detected in koshari dishes may be due to the relatively low pH made koshari meal unsuitable medium for growth most of microorganisms, this opinion was consistent with Abdul-Raouf (1997). The Egyptian Organization for Standardization and Quality Control (*EOSQC*) proposed that the total count of bacteria for liver and luncheon shouldn't excess more than 10^5 *CFU/g*. So, the investigated liver and luncheon sandwiches were not acceptable according to *EOSQC* (2005[a]) *and EOSQC* (2007). Similar finding was reported by Afifi and Hussein (2001) and Khalil *et al.*, (2001).

Medamis with salad sandwiches had *APC* higher than its counterpart without salad. This may due to the cleaning procedure of fresh vegetables that used in green salad was not done in proper way. It should be noted that,

addition green salad to medamis and tamia sandwiches clearly increased their microbial counts (Table 2). This finding was completely applicable with Afifi (2001) studies, who reported that addition of salad to sandwiches increased their counts by 10^3 *CFU/g*.

Table (1): Total aerobic plate counts (*APC*) of most consumable fast foods in Qena's restaurants.

Samples	No. units with total aerobic count (log *CFU* g^{-1}) in the rang:				Mean (log *CFU* g^{-1})
	<4.0	≤4.0-5.0	≤5.0-6.0	≤6.0-7.0	
Medamis with salad sandwiches	-	3	4	3	$4\times10^{6\,a}$
Medamis without salad sandwiches	1	2	5	2	$1.2\times10^{6\,d}$
Tamia with salad sandwiches	1	1	3	5	$3.9\times10^{7\,d}$
Tamia without salad sandwiches	-	2	2	6	$2.7\times10^{7\,c}$
Koshari dishes	-	1	7	2	$5.7\times10^{6\,a}$
Béchamel macaroni dishes	1	1	3	5	$1.8\times10^{7\,b}$
Hawawshi sandwiches (loafs)	1	1	2	6	$9.2\times10^{7\,g}$
Shawerma sandwiches	2	5	2	1	$12\times10^{5\,a}$
Roasted kofta sandwiches	1	3	2	4	$2.1\times10^{7\,bc}$
Liver sandwiches	1	1	3	5	$7.5\times10^{7\,f}$
Luncheon sandwiches	-	1	2	7	$6.1\times10^{7\,e}$

All values represent the means of 10 replications.
Means with different letters are significantly different (p<0.01).

Table (2): Total aerobic plate counts for constituent of most consumable fast foods in Qena's restaurants.

Samples	No. units with total aerobic count (log *CFU* g^{-1}) in the rang:							Mean (log *CFU* g^{-1})
	<4.0	≤4.0-5.0	≤5.0-6.0	≤6.0-7.0	≤7.0-8.0	≤8.0-9.0	≤9.0-10.0	
Medams dishes	-	4	5	1	-	-	-	$2.3\times10^{5\,b}$
Tameia balles	-	1	4	4	1	-	-	$3.1\times10^{6\,bc}$
Green salad	-	-	-	-	2	3	5	$12\times10^{9\,e}$
Tahina salad	1	2	4	3	-	-	-	$5.1\times10^{6\,c}$
Roasted kofta	-	-	-	1	3	4	2	$8.5\times10^{8\,d}$
Asage	-	-	-	1	3	5	1	$10.5\times10^{8\,de}$
Macaroni	2	5	3	-	-	-	-	$1.4\times10^{4\,a}$
Béchamel sauce	-	-	-	1	4	5	-	$9.2\times10^{8\,d}$
Bread	2	6	2	-	-	-	-	$3.3\times10^{4\,a}$

All values represent the means of 10 replications.
Means with different letters are significantly different (p<0.01).

Béchamel macaroni had a high microbial load with a mean value of 1.8 × 10^7 *CFU/g*. It is shown that minced meat (assage) had highest microbial load with a mean value 10.5 × 10^8 *CFU/g* followed by Béchamel sauce, 9.2 × 10^8 *CFU/g*. (Table, 2). It may be due to ingredients of Béchamel sauce such as egg and milk, in additionally to minced meat were a perishable foods and good media for almost of pathogenic bacteria (Much *et al.*, 2007).

Data listed in Table (2) show that the mean value of APC of tahina sample was 5.1 × 10^6 *CFU/g*. *EOSQC* (2006) reported that tahina must be free from any organisms. So that, investigated tahina which added to

sandwiches was not safe enough for human feeding. Sandwiches of stewed bean and roasted kofta had a relatively high load of bacteria. The contamination of those samples may be attributed to the lack sanitary conditions of handling and preparation. Moreover, the storage after cooking or preparations at warm temperature, which consider suitable, condition for growth of most mesophilic microorganisms. Similar finding were reported by Rao and Ramesh (1988).

2- Identification of some pathogenic bacteria isolated from fast foods:

The mean total counts of *Bacillus cereus*, *Shigella* spp., *Salmonella* spp., *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas* spp. are illustrated in Table (3).

Table (3): Mean values of some pathogenic bacteria that isolated from the most consumable fast foods in Qena's restaurants.

Samples	Means (log *CFU* g^{-1}) of No. units with pathogenic bacteria counts*					
	Bacillius Cereus	*Shigella Spp.*	*Salmonella Spp.*	*E. Coli*	*Staph. Aureus*	*Pesud. Spp.*
Medamis with salad sandwiches	$1\times10^{2\,a}$	$1\times10^{3\,a}$	$1.4\times10^{3\,b}$	$1.4\times10^{2\,a}$	$1.8\times10^{3\,d}$	$5\times10^{2\,b}$
Medamis without salad sandwiches	-	-	$2\times10^{2\,a}$	$1\times10^{2\,a}$	$1.1\times10^{3\,bc}$	-
Tamia with salad sandwiches	-	-	$1.5\times10^{2\,a}$	$1.2\times10^{2\,a}$	$1\times10^{3\,b}$	$6\times10^{2\,c}$
Tamia without salad sandwiches	-	-	-	-	$3.8\times10^{2\,a}$	$4.5\times10^{2\,b}$
Koshari dishes	-	-	-	-	$1.5\times10^{3\,c}$	-
Béchamel macaroni dishes	-	-	-	-	$5.4\times10^{3\,e}$	-
Hawawshi sandwiches	$2\times10^{2\,a}$	-	-	-	-	$1\times10^{2\,a}$
Shawerma sandwiches	-	-	$1\times10^{2\,a}$	$1\times10^{2\,a}$	-	-
Roasted kofta sandwiches	$1\times10^{2\,a}$	$1\times10^{3\,a}$	$1.2\times10^{2\,a}$	$3.7\times10^{2\,b}$	-	-
Liver sandwiches	$1\times10^{2\,a}$	-	$1\times10^{3\,b}$	$5.7\times10^{2\,c}$	-	$1.5\times10^{3\,a}$
Luncheon sandwiches	$1\times10^{3\,b}$	-	$1\times10^{2\,a}$	$1\times10^{2\,a}$	$1.3\times10^{3\,bc}$	-

All values represent the means of 10 replications.
Means with different letters are significantly different ($p<0.01$).
*** Dilution in the rang of < 1.0, ≤ 1.0 - 2.0, ≤ 2.0 - 3.0, and ≤ 3.0 - 4.0.**

Total *Bacillus cereus* count:

It could be noticed that *Bacillus cereus* was isolated from sandwiches of medamis with salad, hawawshi, roasted kofta, liver, and luncheon. There were no significant differences in total *B. cereus* counts among the previous samples except luncheon which recorded the highest value. These results are completely agreed with results stated by Mohamed *et al.*, (2004) and Salem (2004).

The mean value of total *B. cereus* count for medamis with salad sandwiches was 1×10^2 *CFU/g*. This result was agreed with the data published by Gamal eldin *et al.*, (2001). Similar finding by Afifi (2001), who reported that the sources of *Bacillus cereus* in medamis sandwiches are likely

to fall into two board categories, first those, entering through the raw material and secondly those enters during handling and serving. On the other hand, *Bacillus cereus* was not detected in any samples of medamis without salad sandwiches, this result may be due to contaminated salad with these bacteria. This finding was within with Nanson and Fields (1982) observations; they isolated *B. cereus* from vegetables and raw plant foods.

Both samples of tamia and koshari were negative for *B. cereus*. This result was in general agreed with the finding by El-bana (2002).

Total *Shigella* spp count:

All investigated samples were free from *Shigella* spp., except medamis with salad and roasted kofta sandwiches with a mean value of 1×10^3 *CFU/g*. *EOSQC* recommended that kofta must be free from *Shigella* spp. So that, the investigated samples of kofta sandwiches were not acceptable according to recommendation safety level of *Shigella* spp. proposed by *EOSQC* (2005[b]). Green salad is considered a main source of contaminated sandwiches with *Shigella* spp,. So, the risk of eating these sandwiches with contaminated from raw vegetables (green salad) could be high. Similar finding was reported by Saddik *et al.*, (1985).

All the investigated tamia sandwiches with and without salads were free from *shigella* spp.. It may be due to the frying procedure is enough to kill this type of bacteria (Much *et al.*, 2007).

Total *Salmonella* spp. count:

Salmonella spp. was isolated from sandwiches of medamis, tamia, shawerma, roasted kofta, liver, and luncheon; the highest values were found in medamis with salad and liver. Similar results were recorded by Abdul-Raouf (1997), Afifi (2001), and Afifi and Hussein (2001).

The mean values of total *Salmonella* spp. count for medamis with and without salad sandwiches were 1.4×10^3 and 2×10^2 *CFU/g*, respectively. Even, significant differences were observed between them. It was observed that sandwiches of tamia with salad were positive for *Salmonella* spp. with a mean value of 1.5×10^2 *CFU/g*, while samples of it without salad were negative. These results reflected that the green salad is the main source of contaminated those sandwiches with *Salmonella* spp.. This observation is within with observation that, Salmonella may survive in vegetable such as, tomatoes, celery for many days as reported by Saddik *et al.*, (1985), El-Gazaly and Ahmed (2003), and Salem (2004).

Salmonella spp. was isolated from liver sandwiches. The mean of total *Salmonella* spp. count was 1×10^3 *CFU/g*. The contamination of liver by Salmonella may be happened during storage after cooking. This result was agreed with that reported by El-Sherif and El-Shafie (1992), and Afifi and Hussein (2001). The statistical analysis recorded that there were a significant differences at ($P > 0.01$) between mean of Salmonella load in liver sandwiches and other positive samples.

Salmonella spp. was isolated from samples of shawerma sandwiches with a mean value of 1×10^2 *CFU/g*. These results were in agreement with those reported by El-Sherif and El-Shafie (1992) and Harakeh *et al.*, (2005).

In general, *Salmonella* spp. is human pathogens has been linked to meat born outbreaks due to contamination of meat from infected meat handlers or indirect contamination (Tauxe, 1991).

An overlock, presence of pathogens such as *Salmonella* spp. and *Staph. aureus* on a fully cooked perishable product indicates a lack sanitary processing practices in post-cook operations, this opinion is consistent with those reported with (Anonymous, 1985).

Total Escherichia coli *count:*

E. coli was isolated from sandwiches of medamis, tamia with salad, shawerma, kofta, liver, and luncheon. The highest mean value was found in liver sandwiches, 5.7×10^2 followed by roasted kofta sandwiches, 3.7×10^2. While, samples of tamia without salad and hawawshi sandwiches, koshari and Béchamel macaroni dishes were free from it. These results agreed with those of El-Sherif and El-Shafie (1992) and Harakeh *et al.*, (2005). Contaminated minced meat with *E. coli* may be considered main source of contaminating products, especially during processing and handling (Nel *et al.*, 2004).

The statistical analysis showed that there were no significant difference between the mean value of shawerma sandwiches and sandwiches of medamis with and without green salad, tamia with green salad, and luncheon. All of positive investigated samples were not safe enough for human feeding because they have total *E. coli* much higher than recommendation safety limit proposed by *EOSQC* (2006).

Total *Staphylococcus aureus* count:

Staphylococcus aureus was isolated from all the studied plant fast food samples. These data are close to those obtained by Afifi and Hussein, (2001), EL-bana, (2002), El-Gazaly and Ahmed (2003) and Salem, (2004). It may be due to hygienic supervision for workers, ingredients and the place of preparation is not clean. In addition, food handlers are responsible for contamination of food by *Staph. aureus* which isolated from worker's hands (Dewit and Kampelmacher, 1988).

As clear, all of the investigated cooked meat samples products (sandwiches of hawawshi, shawerma, roasted kofta, and liver) were free from *Staph. aureus*. The confirmed results by *ICMSF* Bulletin (1996); which reported that *Staph. aureas* is usually readily killed at temperature used in food cooking. The results of liver disagreed with those reported by El-Sherif and El-Shafie (1992) and Afifi and Hussein (2001), who isolated *Staph. aureus* from sandwiches of liver. The data obtained in the current study indicated that *Staph. aureus* was isolated from luncheon sandwiches and Béchamel macaroni dishes. These results are in agreement with those obtained by Khalil *et al.*, (2001). In general, all the positive samples contained *Staph. aureus* much more than recommendation safety limit of proposed by *EOSQC* (2005[a]).

The highest mean value of total *Staph. aureus* count was recorded in béchamel macaroni, 5.4×10^3 *CFU/g.* that's means contamination of these bacteria might occurred after heat processing. Moreover, béchamel macaroni was prepared and left for long period of time till consumed, during this period of time *Staph. Aureus* is able to multiply and produces its toxins (Nel *et al.*,

2004). The statistical analysis indicated that there were significant differences between the means of total *Staph. aureus* count of béchamel macaroni and other examined samples.

Total *Pseudomonas* spp. count:

Pseudomonas spp. was isolated from sandwiches of medamis with salad, tamia, hawawshi and liver, while other investigated samples were negative. The mean value of total *Pseudomonas* spp. count of medamis with salad sandwiches was 5×10^2 *CFU/g*. The mean values of total *Pseudomonas* spp. count of tamia with salad and without salad were 6×10^2 and 4.5×10^2 *CFU/g*, respectively. Even, there were significant differences between them.

Both hawawshi and liver sandwiches were positive for *Pseudomonas* spp. The mean values of total *Pseudomonas* spp. count were 1×10^2 and 1.5×10^2 *CFU/g*, respectively. There were no significant differences between them.

3- Fungal evaluation:

As it is shown from Table (4) medamis with and without green salad, and luncheon sandwiches were only positive for fungi, with a mean values of 9×10^2, 18×10^2, and 3×10^2 *CFU/g*., respectively; while, other samples were negative. Samples of medamis without green salad sandwiches had the highest fungal count. These results agreed with those reported by El-bana (2002). *EOSQC* proposed that medamis should be free from any fungi (*EOSQC*, 2005[c]). So that, all the tested medamis sandwiches were not acceptable according to Egyptian recommendation, and could be unsafe enough for human feeding. Similar finding was reported by Mohamed and Hussein (2004) for luncheon sandwiches. There were significant differences among positive samples in total fungal count.

Table (4): Total fungi counts of the most consumable fast foods available in Qena's restaurants.

Samples	No. units with total fungi counts (log *CFU* g^{-1}) in the rang:				Mean (log *CFU* g^{-1})
	<1.0	≤1.0-2.0	≤2.0-3.0	≤3.0-4.0	
Medamis with salad sandwiches	2	4	4	-	$9\times10^{2\,b}$
Medamis without salad sandwiches	1	3	5	1	$18\times10^{2\,c}$
Tamia with salad sandwiches	-	-	-	-	-
Tamia without salad sandwiches	-	-	-	-	-
Koshari dishes	-	-	-	-	-
Béchamel macaroni dishes	-	-	-	-	-
Hawawshi sandwiches	-	-	-	-	-
Shawerma sandwiches	-	-	-	-	-
Roasted kofta sandwiches	-	-	-	-	-
Liver sandwiches	-	-	-	-	-
Luncheon sandwiches	2	5	3	-	$3\times10^{2\,a}$

All values represent the means of 10 replications.
Means with different letters are significantly different ($p<0.01$).

Data illustrated in Table (5) observed that *Rhizops* spp. and *Pencillum* spp. were only 2 kinds of fungi which identify using microscopic inspection. As it clear, *Rhizops* spp. was isolated from sandwiches of medamis with and without salads and luncheon with a mean values of 5×10^2, 11×10^2, and 1×10^2 *CFU/g*, respectively. While, the mean values of *Pencillum* spp. for the same samples were 4×10^2, 7×10^2, and 2×10^2 *CFU/g*, respectively. Significant differences among previous samples were detected in all *Rhizops* spp. and *Pencillum* spp.

Table (5): Identifications of fungi profile of the most consumable fast foods available in Qena's restaurants.

Total Fungi *Spp.*	No. units with total fungi profile counts (log *CFU* g^{-1}) in the rang:					Mean (log *CFU* g^{-1})
	Samples	<1.0	≤1.0-2.0	≤2.0-3.0	≤3.0-4.0	
Rhizops Spp.	Medamis with salad sandwiches	1	4	5	-	$5\times10^{2\,b}$
	Medamis without salad sandwiches	2	1	6	1	$11\times10^{2\,c}$
	Luncheon sandwiches	2	5	3	-	$1\times10^{2\,a}$
Pencillum Spp.	Medamis with salad sandwiches	1	3	6	-	$4\times10^{2\,b}$
	Medamis without salad sandwiches	2	3	5	-	$7\times10^{2\,c}$
	Luncheon sandwiches	2	4	4	-	$2\times10^{2\,a}$

All values represent the means of 10 replications.
Means with different letters are significantly different ($p<0.01$).

CONCLUSION

In conclusion, data reported in this investigation reveal that all investigated sandwiches were contaminated by one or more of the examined bacteria. Medamis with green salad sandwiches tended to have the highest contamination with different types of bacteria. Addition green salad into sandwiches decreased their microbiological quality. So, the risk of eating these sandwiches could be high. Moreover, meat exposure to direct or high heat leads to kill some pathogenic bacteria. But those meats could be contaminated during storage or preparation of sandwiches. It should be noted that, some bacteria were isolated from sandwiches that were not considered suitable media for growth of these bacteria and that may be due to cross contamination. It could be concluded that, microbial quality of fast foods available in Qenas' restaurants is not acceptable, and may cause some health problems. Microbiological quality of most investigated samples is not within with the Egyptian Organization for Standardization and Quality Control.

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التقييم الميكروبي للأغذية السريعة الأكثر تناولا بمطاعم محافظة قنا

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تم الحصول على عينات عشوائية من بعض الأغذية السريعة التناول من مطاعم مختلفة في مدينة قنا خلال موسم شتاء ٢٠٠٧/٢٠٠٨م للتقييم الميكروبي لها. ومن خلال نتائج الاستبيان اتضح أن أكثر هذه الأغذية تناولا هي: ساندوتشات الطعمية يليها الكبدة وأطباق الكشري وساندوتشات الفول المدمس والحواوشي وأطباق المكرونة الباشميل وساندوتشات الشاورمة واللانشون وأخيرا الكفتة المشوية. ووجد أن هذه العينات تتلوث بواحد أو أكثر من البكتريا التي تم دراستها وهي: *Bacillus cereus*, *Shigella* spp., *Salmonella* spp., *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas* spp.

بينما الفطريات مثل: *Rhizops* spp. and *Pencillum* spp. وجدت في بعض العينات المختبرة. ووجد أن معظم العينات المختبرة تحتوي على بعض الميكروبات المرضية بكمية تفوق الحد الامن الذي أقرته الهيئة المصرية للقياس ومراقبة الجودة - وهذا يعني أن هذه الأغذية غير امنة بالقدر الكافي للانسان ، ولذلك يجب الاقلال من تناولها خارج المنزل واستبدالها بأغذية أخرى أكثر صحية.