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## Study on the current status of bacterial and fungal contamination in the canteen of Al-Qadisiyah University, Iraq.

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### ABSTRACT

The study was conducted on some student canteen at the University of Qadisiyah with two samples for each model. The samples included samples of the faculties of science, education, Arts, administration & economics, physical education, veterinary medicine, mathematics and computers. And the results showed the emergence of species of bacteria in large numbers, namely E.coli, Salmonella typhi, Shigella, Staphylococcus aureus. The highest numbers of Shigella bacteria were recorded (300) in each of the faculties of science and Arts, the least numbers were bacteria E. Coli was prepared 66 in the Faculty of Education. The least colleges are polluted is the College of Mathematics and Computing. For fungus, species appeared as Pencillium, Alternaria alternata, Aspergillus and Geotrichum candidum. These species appeared in all studied samples.

**Keywords:** bacteria, fungal, contamination.

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## INTRODUCTION

Food pollution refers to the containment of food and water to harmful microorganisms and toxic chemicals, which leads to the injury of the consumer.

The human needs to eat food useful and beneficial to the body, as the food provided by the main elements needed by the body to survive and have the ability to perform the tasks and meals required from him to the fullest and to benefit from the human food must meet the health conditions that make the human capable on its consumption. (Zaidi, 2000, Ibraheem and Abed, 2017) Pathogens may be germs, chemicals, or any substance that is harmful to the human body and is capable of being attributed to diseases.

Food pollution has many different causes, perhaps the most prominent of these reasons as following

Food degradation is caused by various factors such as long-term survival in unsafe locations, exposure to radiation from radioactive materials, and many other factors, since humans have direct interference with them. These pollutants are called natural pollutants

Contamination of pathogens caused by food exposure Insects and rodents of all kinds, which transmit bacteria where it is called the type of bacterial contamination name, which is one form or another type of natural contaminants, which help these organisms to transmit the causes of disease to taste and then to those who eat this food from The most common types of pathogens are transmitted to humans through food contaminated with cytonella, which causes known typhoid fever, bacillus and other species. Such contaminants do not affect humans alone, but may affect the different types of animals that may be infected. (Al-Husseini, 2010). Other causes are contamination of food with various human pollutants such as exposure to industrial pollutants resulting from the rise of various evaporation of factories and means of transport.

Some types of fungus grow on food and produce highly hazardous toxins on human health, causing liver cancer, dysfunction of the heart and various tissues, as well as deformities of the pelvis.

Foods that are most susceptible to fungal infections (mold) are grain-like peanuts, lentils, beans, cowpea, dry peas, and so on are bread and flour along with various kinds of nuts such as hazelnuts, almonds and dried fruits such as figs, apricots, raisins and dates. (Bahadli *et al.*, 1986)

The most important causes of fungal contamination is the development of food in dirty environments, or mixing it with corrupt water, and many other types of contaminants, and may cause human pollutants to the food is very dangerous diseases, especially the types of cancers spread throughout the world on a very large scale, In order to reduce the incidence of such malignant diseases. (Timose *et al.*, 2010).

The aim of the research is to diagnose bacterial and fungal infections in some of the student clubs in the faculties of University of Al-Qadisiyah.

## MATERIALS AND METHODS

### Collections of samples

The samples were collected for the current study from some student clubs at the University of Qadisiyah with two samples for each model. The samples included samples of the faculties (science, education, Arts, administration and economics, physical education, veterinary medicine and mathematics and computers). In addition to the workers' labs, the samples were brought to the laboratory and cultured in the laboratory media, then incubated for bacteria 37 ° C and fungi 25 ° C.

### Culture Media:

The culture media were prepared according to the instructions of the company equipped and the media are:

1. Nutrient agar media, A general medium for the development of bacteria and primary isolation

2. Eosin Methylene media (EMB) in a differential center to distinguish E.coli bacteria
3. Salmonella-Shigella agar, a central medium for the development of isolates of Salmonella and Shikla bacteria.
4. The Mannitol salt agar medium for the development and diagnosis of fermented staphylococcus bacteria
5. Peptone water was used to investigate the susceptibility of bacteria to the production of endol roots
6. Simmons citrate to determine the ability of bacteria to consume jackets as a single source of carbon and energy
7. Methyl Red-Voges Proskaur (MR-VP) to determine the susceptibility of bacteria to acid formation and formation of Acetyl Methyl carbinol
8. Sabouraud dextrose Use this medium to isolate and fertilize growth fungi

**Isolation and diagnosis of bacteria**

A- Appearance Characteristics Morphological Characteristics

Where the study of the characteristics of the colonies of growth bacteria on culture media in terms of color and edges and transparency and then examination of microbial properties after the chromosome pigmentation and the observation of its interaction with the qualities and shape of cells and other attributes (Kandler and Weiss, 1986).

B- Biochemical tests

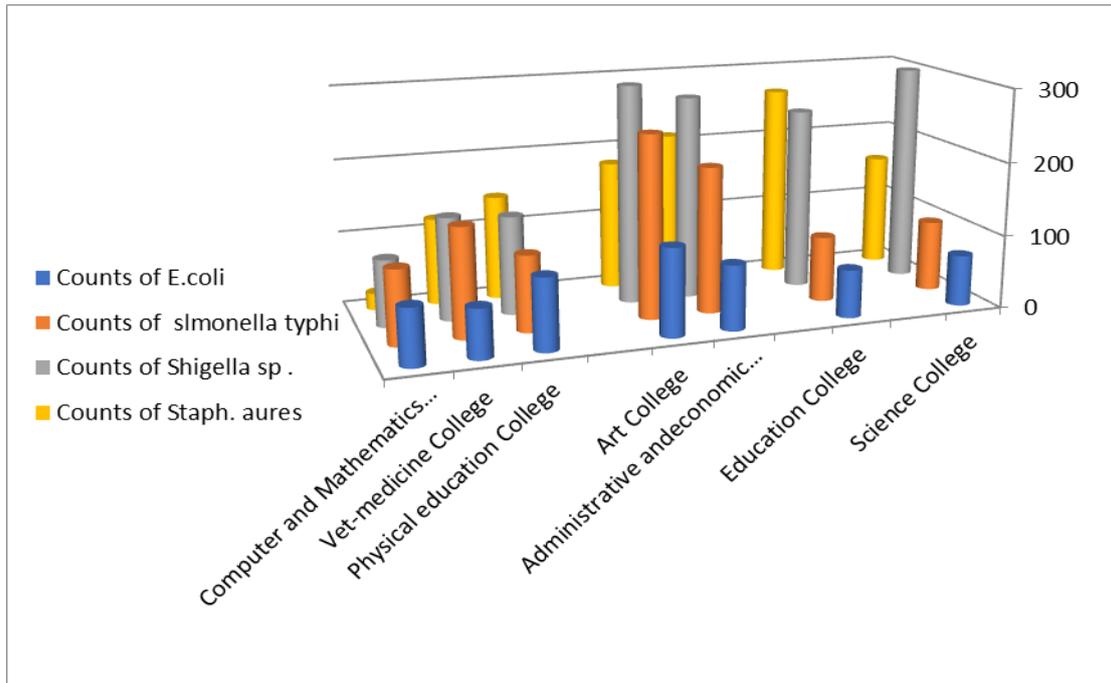
- Methy -Red Test and Voges-Proskauer Test Mac Faddin, 2000)
- Citrate Utilization test and the Indole test (Colle et al., 1996)

**Table (1) shows the number of bacterial species found in some colleges of Qadisiyah University**

Counts of <i>Staph. aureus</i>	Counts of <i>Shigella</i> sp .	Counts of <i>Salmonella typhi</i>	Counts of <i>E.coli</i>	Colleges	No.
156	300	97	70	Science College	1
266	250	90	66	Education College	2
212	279	200	89	Administrative and economic College	3
178	300	250	120	Art College	4
143	135	104	98	Physical education College	5
119	141	149	67	Vet-medicine College	6
23	92	102	77	Computer and Mathematics College	7

**Table (2) Fungal species found in samples**

Fungal Species	Colleges	No.
<i>Pencillium</i> ,	Science College	1
<i>Aspergillus</i>	Education College	2
<i>Geotrichum candidum</i>	Administrative and Economic College	3
<i>Alternaria alternate</i> <i>Geotrichum candidum</i>	Art College	4
<i>Aspergillus</i>	Physical education College	5
<i>Aspergillus</i>	Veterinary medicine College	6
<i>Geotrichum candidum</i>	Computer and Mathematics College	7



A chart showing the numbers of bacterial species studied in some canteens of Qadisiyah University.

### DISCUSSION

From the table above, it is noted that the highest value was related to the bacteria *Shigella sp.* Where the highest value in the faculties of science and arts 300 (279, 250), in the colleges of administration and economics and education, respectively, while the lowest value was (92) in the Faculty of Computer and Mathematics. This bacteria is known to be a bacterium that has the ability to reduce nitrates and dissolve proteins without H<sub>2</sub>S production. In many environments, non-heat-resistant intestinal toxin is found in food such as meat, milk, vegetables, and many foods stored at room temperature. These bacteria are highly contagious because the effective dose causing the disease is less than 100 bacterial cells (Azzawi, 2010).

As for *Staphylococcus aureus*, large numbers (266, 212, 178, 156 and 143) were enrolled in the Faculties of Education, Administration and Economics, Arts, Sciences and Physical Education, respectively. These bacteria produce these bacteria Enterotoxin occurs when cluster poisoning occurs when the following conditions are met

1. The food contains a large number of gold cluster microbe that production toxin.
2. The food is a good environment suitable for the growth of the microbial and the production of toxin
3. The temperature should be suitable and the appropriate time allows for the production of toxin.

The most important sources of microbes are humans and animals, where there is nature flora in the cavities of the nose and mouth and on the human skin and boils and contaminated wounds, as well as from the sources of this bacteria is the disease of the day and the herds in cattle and toxin in the milk produced and products are therefore livestock cattle are important sources of this bacteria where there In the milk produced, especially from the case of inflammation of cattle and grow these bacteria and produce toxins under the air and anaerobic conditions, although the quantities of toxins produced less under the anaerobic conditions. *Lactobacillus* is an important source of these bacteria. In particular, milk is produced from the case of inflammation of the cattle. These bacteria grow and produce toxins under the aerobic and anaerobic conditions, although the quantities of toxins produced are less under the anaerobic conditions. (Al-Muhaimi, 2014).

For *Salmonella typhi*, the highest numbers were in the faculties of Arts, Administration and Economics (Veterinary, Mathematical, Computer and Science) and Education College (250, 200, 149, 104, 102, 97 and 90),

respectively. It is known that these bacteria bronchial aerobic and aerobic produce H<sub>2</sub>O characterized by the following:

- The ability to grow in different types of food under a wide range of temperatures to be large numbers cause infection.
- Easy to move and spread.
- The persistence of the secretion of bacteria for a long time after recovery, including the carriers of the disease.
- Produces two types of toxins.

A: Enterotoxin increases the rate of fluid secretion in the intestinal cavity leading to fluid buildup in the intestines and diarrhea

B: Cytotoxin is inhibitory protein that leads to cellular secretion in the mucous membranes of the intestines. (Tamimi, 2014). The main reason behind the transfer of food to these bacteria is the lack of good health and security, whether it is in the preparation and preparation and cooking phase. (Al-Nawawi and others, 2003)

The recorded numbers were 120, 98, 89, 77, 70, 67 and 66 in the colleges (Arts, Physical education, Administration and Economics, Computers, Science, Veterinary Medicine and Education) respectively, and these bacteria recorded the lowest numbers studied, It is a natural flora in the large intestine in humans and animals, but there are strains that cause intestinal diseases.

As well as food poisoning. They can cause blood poisoning and are known as Enteropathogenic. These bacteria produce two types of intestinal toxins, one non-heat resistant and the other heat resistant. Most breeds produce both. These toxins are responsible for infantile diarrhea. Infantile diarrhea And Traveler's Diarrhea (Al-Muhaimi, 2014).

For the table (2) of the fungi that emerged it was diagnosed in the samples studied were the *Penicillium*, *Alternaria alternate*, *Aspergillus* and *Geotrichum candidum*. These species appeared in the studied samples studied. It is one of the most widespread and dangerous fungi. These fungi produce many types of toxins, the most dangerous of which are aflatoxins. Which cause poisoning and at large quantities any presence at high concentrations can lead to death and often cause abnormal biologic changes in the organism that it deals with contaminated food may be transmitted to humans toxins indirectly through the contamination of food components with toxins or through human feed on animal products fed on contaminated fungi. (Marcellino *et al.*, 2001).

It is known to be contaminated with fungal toxins, and fungal toxins have many different effects depending on the toxin, its dose and the period of exposure. These effects are toxic to the kidneys and liver and are also considered carcinogenic toxins. Pasteurization and sterilization have a very poor effect on these aflatoxins when using dairy cattle fed on fodder contaminated with these toxins or other contaminated food such as legumes, eggs, rotten vegetables and others (Shibli *et al.*, 2002).

### CONCLUSIONS

1. All samples studied were contaminated with bacteria and fungi.
2. The most bacteria number and which appeared are bacteria *Shigella* Sp. The lowest number is *E. coli*.
3. Most colleges are contaminated and in high numbers are the Faculty of Arts, Education, Administration and Economics and College of Science.
4. The least colleges are contaminated is the Faculty of Mathematics and Computer.
5. The most polluted samples were of fresh vegetables, salads and appetizers and this indicates the lack of care for washing and clean.

Recommendations:

1. Conduct periodic examinations of all university canteens.
2. To conduct a health check for staff in canteens and ensure the existence of health certificate for them.

3. Conducting more tests on food.
4. Attention to washing vegetables and dishes used in cooking.

Many plants that have proven effective against bacteria and fungi can be used in the form of spices to improve food flavor such as black bean, chili pepper and cumin.

#### REFERENCES

- [1] Al-Bahadli, Ali Hussein, Iyad Bad Al-Wahid and Al-Hitar (1986). The Fourth Scientific Conference of the Scientific Research Council. Baghdad . Iraq.
- [2] Al - Toumi, Abdul Razzaq Sulaiman, Mohammed Mohammed Al - Imam and Abdul Basit Ramadan Abu Zweida (2013) The basics of laboratory and clinical bacterial diagnosis. Dar Al Kutub For Printing & Publishing. Ammaan Jordan.
- [3] Zaidi, Hamid Majid (2000) Microbiology, Ministry of Higher Education and Scientific Research, University of Baghdad, Iraq.
- [4] Al - Shibli, Majid Kazem and Hussain Khudair Al - Mayali (2002). The effect of toxins produced by *Alternaria alternates* in blood and weight of mice. Vol. Issue 2.  
Al-Azzawi, Rehab Rasheed (2010). Jordan.
- [5] Al-Muhaimi, Rasha Mohammed (2014) Meicobacteria in food and feed. Benha University, Faculty of Agriculture. Egypt.
- [6] Timoz, Solaf Hamed, Walaa Abdul - Ridha, Tayef Mazhar Muslim and Malik Ali Karim (2010) Isolation and diagnosis of contaminated microorganisms of the fruits of some varieties of tomatoes in the local markets of Diwaniyah province. Number 4.
- [7] Al-Nawawi, Mohammed Abdul Razzaq and Wasama Mohammad Radwan (2003). Food processing and environment. Ain-Shams University . Cairo
- [8] Abdel-Hussein, Mohamed Mohsen - 2001 Study on opportunistic fungi associated with ear infections in the province of Qadisiyah, MA - Faculty of Education - University of Qadisiyah
- [9] Collee, J.G.; Fraser ,A,B.P.(1996) Mackie & McCartney partical medical microbiology .14<sup>th</sup> ed.The Churchill Livingston .In. USA
- [10] MacFaddin , J .F.(2000) Biochemical testes for identification of medical Bacteria . 3<sup>rd</sup> . Lippincott William and Wilkins . USA .
- [11] Marcellino , N.E.Beuvier , M.Gueguen and D.R.B. (2001) Diversity of *Geotrichum candidum* strain isolated from tomato .
- [12] Lujain H. Ibraheem and Salwan A. Abed (2017), ACCUMULATION DETECTION OF SOME HEAVY METALS IN SOME TYPES OF FRUITS IN THE LOCAL MARKET OF AL-DIWANIYAH CITY, IRAQ, RASAYAN Journal of Chemistry, Vol.10, No.2 (339-343).
- [13] Sauer, D.B.,Seitz,L.M., Rosmary , Roy,J.M and Harry,D.A. (1978). Toxicity of *Alternaria* metabolites found in wea-Thered sorghum grain at harvest .J.Agric.Food Chem.(26). 1380.
- [14] Steven ,A.and Celso (2005) Tomato .Horticultural science department , University of Florida , Gainesville .
- [15] Kandler, O., N. Weiss, 1986. In: Bergey's Manual of Systematic Bacteriology, P. H. A. Sneath, N. S. Mair, M. E. Sharpe, J. G. Holt (Eds), Vol. 2, Baltimore: Williams and Wilkins