

The Microbial Quality of Fast Food and Traditional Fast Food

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Abstract: Sixty food samples were collected from 60 random restaurants of fast and traditional fast foods in El Qassium, Saudi Arabia and investigated for bacteria species using different temperatures (10°C, 20°C, 30°C, 40°C and 50°C) incubated for 24-48 hours and analyzed for fungi and yeasts incubated at 25°C. The results revealed that from 45 sample of traditional foods, yielded a total twenty two species of eighteen genera of bacteria. A fourteen species of twelve genera of fungi and three species of three genera of yeasts. While fast food results revealed that from 15 fast food samples collected from 15 restaurants a total ten species of ten genera of bacteria. A total eight species of seven genera of fungi. The species of bacteria isolated in this study namely, *Acetobacter sp.*, *Achromobacter sp.*, *Bacillus coagulans*, *B. Subtilis*, *Clostridium perfringens*, *Erwinia carotovora*, *Escherichia coli*, *Flavobacterium sp.*, *Klebsiella pneumoniae*, *Lactobacillus plantarum*, *Leuconostoc mesenteroides*, *Listeria monocytogenes*, *Microbacterium lacticum*, *Micrococcus sp.*, *Pseudomonas aeruginosa*, *Pseudomonas fluorescens*, *Pseudomonas putrefaciens*, *Salmonella sp.*, *Staphylococcus aureus*, *Streptococcus lactis*, *Streptococcus thermophilus*, *Campylobacter jejuni*, *Citrobacter freundii*, *Proteus vulgaris* and *Yersinia sp.* The occurrence of some these bacteria illustrate that fast foods in these restaurants may act as a reservoir of pathogenic bacteria for human. Fungi isolated namely *Aspergillus glaucus*, *A. niger*, *Alternaria sp.*, *Cheotomium candidum*, *Cladosporium herbarum*, *Fusarium sp.*, *Monilia sp.*, *Mucor rouxii*, *Neurospora sp.*, *Penicillium expansum*, *Penicillium sp.*, *Rhizopus nigricans*, *Sporotrichum carinis* and *Thamnidium elegans*. Yeasts were represented namely *Torulopsis caroliniana*, *Saccharomyces rouxii* and *Zygosaccharomyces sp.* Total viable count of bacteria (CFU) was higher in foods containing vegetable salad and fresh vegetables more than heated foods (e.g., chicken Shawarma, Beef burger). Some bacteria resist heat and grown at 50°C. Contamination occurred through raw foods, use of polluted irrigation waters, human handling and the use of contaminated containers. The binge-eating of fast food can lead to measurable signs of liver injury, inflammation and inexpensive fat-and calorie-packed foods make as the fattest. Food poisoning can be controlled by the adjustment of pH, water activity, temperature control. Prevention of toxins in fast foods must become a cooperative effort on the part of all involved in food production. Prevent multiply the microorganisms by washing and dry hands before preparing any foods and after handling raw foods (meat, poultry, vegetables or fruits), food preparation areas, equipment must be cleaned, kitchen areas, restaurants and foods protected from insects, pests and other animals. Patients should not handle foods in restaurants. [Nature and Science 2010;8(10):117-133]. (ISSN: 1545-0740).

Key words: Fast food, traditional fast food, bacteria, fungi, yeasts, temperatures, contamination, poisoning food.

1. Introduction

Food is a chemically complex matrix, and predicting whether, or how fast, microorganisms will grow in any given food is difficult. Most foods contain sufficient nutrients to support microbial growth. Several factors encourage, prevent, or limit the growth of microorganisms in foods, the most important are water availability, pH, and temperature (Makukutu and Guthrie, 1986; Smith and Fratamico, 1995 and ICMSF (eds), 1996).

The busy and hectic life schedule has opened the way for the fast food industry in most parts of the world. The traditional or conventional way of cooking is over and the fast food joints are visible everywhere. Fast food does not only include the traditional fast food items like pizza, burger or French fries but it also includes Chinese as well as Indian. The most typical fast food meals eaten in Germany are similar to those eaten in American namely burger, Pizza and freis from well-known chains such as MacDonald's burger king and Pizza Hut. Other popular meals are (a sliced

sausage with ketchup and mayonnaise), Kebab (the meat is served in flatbread along with lettuce, onion, cucumber, tomatoes) (Ockerman and Stec, 1980; El-Sherif et al., 1991). Although fast food restaurants are often viewed as a representation of modern technology, the concept of "ready-cooked food to go" is as old as cities themselves; unique variations are historical in various cultures. Ancient Roman cities had bread-and-olive stands, flat bread and falafel are ubiquitous in Middle East. Food habits, pattern and behavior vary widely from culture to culture. Popular Saudi Arabian traditional foods include meat, rice, wheat, vegetables and species that give these recipes a special flavor.

There are many popular foods in Saudi Arabia like Jarish, Qursan, Saliq, Masapep, Keshta, Mataziz, Freek, Hunayni and Harisah (Print edition of Saudi Aramco World, 1975).

In recent years just about all the quick service

restaurants have added salads fresh vegetables (Lettuce, Cabbage, Carrot, Cucumber, Onion, Ketchup, Mayonise). Some foods will be cooked prior to consumption others will be eaten raw. Products that might be classed with both fresh and processed vegetables are the chopped salad ingredients sold in the grocery store and to the institutional trade. Although essentially fresh produce, contamination during processing, and changes in microbial growth patterns during storage, may later to microflora of these foods quantitatively and qualitatively. The inner tissues of healthy plants and animals are free of microorganisms. However, the surfaces of raw vegetables and meats are contaminated with a variety of microorganisms and this depends on the condition of the raw product, the method of handling, the time and conditions of storage (Wood-Ward, 1996; Odumeru et al., 1997 and Pelczar et al., 2006).

Microbial food safety is an increasing public health concern worldwide. It is estimated that each year in the United States there are approximately 76 million food borne illnesses. Cases are caused by *Campylobacter spp.*, nontyphoidal salmonella, pathogenic *Escherichia coli* all colonize the gastrointestinal tracts of a wide range of wild and domestic animals, especially animals raised for human consumption (Meng and Doyle, 1998). Food contamination with these pathogens can occur at multiple steps along the food chain, including production, processing, distribution, retail marketing and handling or preparation. It was reported that numerous epidemiological reports have implicated foods of animal origin as the major vehicles associated with illnesses caused by food-borne pathogens (Petersen and James, 1998).

Contaminated raw or undercooked poultry and red meats are particularly important in transmitting these food borne pathogens. Other sources of human infections include contaminated produce and contact with farm animals and pets. Person-to person transmission has also been described. Dangerous microorganisms are found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially chopping boards. The slightest contact can transfer them to food and cause food borne disease. examples of zoonotic pathogens that may be transmitted in this way include *Salmonella*, *Campylobacter*, *Escherichia coli* and eggs of the tape worm, *Taenia solium* (Meng and Doyle, 1998).

The gut is the most important source of bacteria, contributing *Clostridium perfringens*, *Coliforms*, *Salmonella* and *Staphylococcus* to the meat surface. Mesophiles, including pathogens, cannot grow on

chilled carcasses, but psychrotrophs of the *Pseudomonas*, *Achromobacter* grow readily, and eventually spoil the meat (Meng and Doyle, 1998). The conditions in a well wrapped piece of meat encourage the growth of the *Lactobacilli* at the expense of the *Pseudomonas*, *Achromobacter* group (Petersen and James, 1998).

Pathogenic microorganisms on raw vegetables and fruits suggested that the use of poor quality water for irrigation could increase the incidence of enteric pathogens (*E. coli*), *Erwinia spp.*, *Aeromonas*, *Serratia spp.* and some gram negative bacteria, *Pseudomonas spp.*, *Citroacter freundii*, *Clostridium* and *Xanthomonas* and also *Staphylococcus aureus*, *Corynebacterium*, *Listeria spp.*, *Lactobacillus spp.*, *Streptococcus spp.*, *Micrococcus spp.*, as gram positive bacteria. The consumption of fast foods, raw milk and raw milk products have been reported to be associated with serious health problems (De Boer and Hahne, 1990; Pacini et al., 1997; Food and Drug Administration (FDA), 2000 and Pelczar et al., 2006).

Microorganisms in fast and traditional fast foods are responsible for many human diseases. e.g *Salmonella* bacteria is a common cause of food borne illness, particularly in undercooked chicken and chicken eggs (Woodward, 1996; Kaneko et al., 1999; Uyttendaele et al., 1999 and Angelillo et al., 2000).

However, some studies suggested the incidence of *Listeria sp.* in retail foods, ready-cooked chicken, on the hands of food workers, food stuffs, human faeces, sewage and soil from urban sources (Kerr, 1993 and MacGowan et al., 1994).

Furthermore, it was reported the prevalence of *Campylobacter spp.*, *Staphylococcus spp.*, *Escherichia coli*, *Salmonella spp.*, *Yersinia Spp.* and *Listeria* on meat, sea foods, vegetable ingredients, chicken shawarmas, raw and cooked foods, raw chicken, beef burger sandwiches, ready-to eat salad vegetables, commercial mayonnaise, frozen chicken, poultry products and on the hands of food workers (Kaneko et al., 1999 and Pelczar et al., 2006).

Uzeh et al. (2009) reported that microorganisms isolated from salad containing raw vegetables include *Mucor sp.*, *Aspergillus fumigatus*, *Trichoderma*, *Neurospora crassa* and *Aspergillus niger*.

It was investigated that fast food contains high levels of refined sugar, white flour, trans fat and polyunsaturated fat, salts and numerous food additives, at the same time it is lacking in proteins, vitamins and fiber. Consumption of fast food in the world has been associated with obesity leading to many diseases (Canadian Institute for Health Information, 2007).

Raw materials, including water, ice and milk, may be contaminated with dangerous microorganisms. Toxic chemicals may be formed in damaged and mouldy foods. Care in selection of raw material and simple measures such as washing and peeling, may reduce the risk. Contaminated water, for example, has been associated with outbreaks of *Salmonella*, *Campylobacter* and *Escherichia coli*, whilst infections with *Salmonella*, *Campylobacter*, *Mycobacteria* (TB), *Brucella* and *Escherichia coli* can be acquired through the consumption of contaminated milk or dairy products that are not pasteurized (Meng and Doyle, 1998). When raw milk is left standing for a while, it turns "sour" this is the result of fermentation, where lactic acid bacteria ferment the lactose inside the milk into lactic acid. Prolonged fermentation may render the milk unpleasant to consume. This fermentation process is exploited by the introduction of bacterial cultures (e.g., *Lactobacilli sp.*, *Streptococcus sp.*, *Leuconostoc sp.* ...etc) to produce a variety of fermented milk products. The reduced pH from lactic acid accumulation denatures protein and caused the milk to undergo a variety of different transformations in appearance and texture. Fast foods sold in a restaurant or store with low quality preparation and served to the customer in a packaged form for take out/take away. In most fast food operations, menu items are generally made from processed ingredients prepared at a central supply facility and then shipped to individual outlets where they are reheated, cooked (usually by microwave or deep frying) or assembled in a short amount of time, fast food are often very high in calories, saturated fat and sodium that can make us fatter, clog our arteries and send our blood pressure soaring. Some items from McDonald's menu in particular include chicken, hamburgers, French fries, Egg McMuffins-Premium salad, chicken sandwiches, yogurt parfaits and fruit salads. Food substances that have been prepared by a fermentative process, or have been exposed to microbial contamination during aging or storage, are likely to contain amines. Alcoholic beverages such as beers can contain biogenic amines, as do some other fermented foods such as sauerkraut and soy bean products (Sanchez, 2009). Amines were also considered as endogenous to plant substance that is commonly used for food, where some vegetables and fruits were found to contain high concentrations of various amines. The biogenic amine content of various foods and feed have been widely studied and found in cheese, fish, meat products, eggs and mushrooms. Biogenic amines may also be considered as carcinogens because of their ability to react with nitrites to form potentially carcinogenic nitrosamines. The toxicity of biogenic amines to chicks in terms of loss of weight and mortality was also reported (Heaton and Jones, 2008).

Meat, produce and soft cheeses (e.g., brie, cheese, cottage cheese) have more water content, allowing any bacteria, viruses or molds present to multiply quickly (Bichai et al., 2008).

It was suggested that ensure that food is cooked thoroughly to the correct temperature because proper cooking kills almost all dangerous microorganisms. Studies have shown that cooking food to a temperature of 70°C can help ensure that it is safe for consumption. For example poultry, minced meat products (e.g., hamburger and sausages). Ideally, the center of the food should reach a temperature of 70°C for at least two minutes (Makukutu and Guthrie, 1986). Chilled, ready to eat foods must be kept to temperature below 5°C. Hot foods must be kept at temperatures above 60°C before serving. Cool rapidly and refrigerate left over foods if they are not to be used within 2 hours. Food should be cold before placing in the refrigerator since it may take a while to cool off in the refrigerator and hot food may warm up other foods (Kaneka et al., 1999). Some of the highest aerobic counts have been reported for tubers and other vegetables that are in contact with the soil e.g., lettuce, carrots, potatoes and cabbage and flafel with fresh vegetable salads record the highest count of microorganism (Kaneko et al., 1999). The high acid and sugar content of fruits often permits yeasts and molds to predominate, while the high carbohydrate content of many vegetables favors the lactic acid bacteria. It was reported that the major source of the organisms on frozen vegetables is contaminated equipment. Operations that have been especially troublesome choppers, slicers, conveyor and inspection helts, and filling machines. Some of these units possess surface that are difficult to reach for proper cleaning. Belts may present problems because of the tenacity with which organisms adhere to certain surfaces, and because some fabrics absorb moisture and thus permit a microbial build up within the belt interior. Many organisms do not survive in a low pH environment; for example, *Salmonella* and *Shigella* die off rapidly in citrus juices (Norberg, 1981).

Contamination of eggs and egg products: Contamination of the egg shell occurs after laying nesting material, dirt, and fecal matter. It was reported that the flora of egg shells is dominated by gram positive cocci while the gram negative rods are present in numbers. The contents of shell eggs may become contaminated with organisms from the shell surface by improper washing and storage methods. The most common genera of bacteria found in liquid eggs are gram negative types, including *Pseudomonas*, *Proteus* and *Escherichia*. In commercial egg breaking operations the egg shell is a source of contamination and may contribute large numbers of gram positive cocci to the liquid egg (Administration Urged to Boost

Food Safety, 2009). Colonization of the shell contents is characterized by a mixed flora of gram negative bacteria. The most common contaminants are the *Coliforms*, *Achromobacter*, *Pseudomonas*, *Serratia*, *Proteus*, *Alcaligenes* and *Citrobacter* (Finegold and Martin, 1982; Uyttendaele et al., 1999). The major pathogen associated with eggs and egg products is salmonella.

Some meat products such as flame seared beef patties and cooked beef are processed at lower temperatures. These temperatures are sufficient to destroy pathogens, but the final bacterial counts include some of the more heat resistant vegetative bacteria such as the enterococci. Unless cooked products are packaged hot and immediately frozen, recontamination invariably occurs from equipment, food handlers, raw products or dust (Angelillo et al., 2000).

Human health and mycotoxins: It was reported that the ubiquitous fungal strains involved could utilize wide variety of foodstuffs for toxin production. Several mycotoxins have been verified as naturally occurring foods and feeds (Barnett et al., 2000). Most mycotoxins of man or animals have been recognized by observation of the toxicity of moldy foods and feeds. The toxigenic storage fungi are primarily *Aspergillus*, *penicillium*, while some like *Fusarium* may be either field or storage organisms. The mycotoxins presently considered to present the most potential for human health hazard are the toxins of the storage fungi in the genera, *Aspergillus*, *Penicillium* and *Fusarium* are those elaborating mycotoxins which are more important in foods and feeds.

Some of the mycotoxin findings reported represent extensive survey, others are very limited. Fungi, such as the moulds commonly seen on bread, can also cause illness while viruses such as hepatitis A may also be food borne (Wart, 1989). It was reported that when foods such as meat, spaghetti sauce or vegetables are canned, the oxygen can't get in therefore growth of aerobic organisms is controlled and the food is preserved. Some microorganisms will grow only in anaerobic conditions. Botulism is a rare type of food borne illness caused by microorganism that prefers anaerobic conditions. Home canned food that haven't been preserved properly are the most common source of this type of food borne illness (Kao and Shih, 1993 and Pacini et al., 1997).

The objectives of this study were to determine the presence of pathogenic bacteria, fungi and yeasts in fast foods and in traditional foods in some restaurants causing human diseases, and to investigate the association of microbial contamination with

component, type, temperature, season of foods. This study carried out to give information about the methods of prevention of diseases due to food borne pathogens and how to control it.

2 - Materials and Methods

Sixty restaurants were used in the present study. Fast and traditional foods samples were obtained from fast food and traditional fast food restaurants in El Qassim, Saudi Arabia in Summer. The Centers for Disease Control Food Borne Diseases Active Surveillance Network (Food net) data indicate that outbreaks and clusters of food-borne infections peak during the warmest months of the year (Centers for Disease Control and Prevention, 2001).

Samples of foods: A) Traditional foods: The traditional fast foods which were used in the research: 1. *Jarish*: composed of yorgot, animal fats, crush wheat, oil, salts and speices. *Jarish* may be simply boiled and served with a topping of chopped hot paper and onion or it may be browned in butter or oil and then cooked into a sort of pilaf with a chunks of meat, chopped onion and tomato for the richly flavored dish. 2. *Mataziz*: composed of flour, meat, cucurbita, onion, oil, spices, tomato and salt. 3. *Qursan*: included meat, oil, different vegetables onion, tomato, limon and salt. 4. *Keshta*: included of palm, butter and flour. 5. *Mathbib*: Contained eggs, oil, flour, salt and sugar. 6. *Freek*: composed of eggs, flour, sugar, small amount of salt and cinnamum zeylani. 7. *Hunayni*: included palm, bread, butter, spices and water. 8. *Saliq*: contained chicken, rice, milk and spices. The rice first half cooked in meat or chicken both and then with milk for one. 9. *Harees*: composed of meat, sugar, butter, wheat, salt and cinnamum zeylani.

B) Fast foods: 1. Chicken shawrmas with salads. 2. Hamburger (beef burger) with salads. 3. Flafel with salads (leuttuce, tomato, onion, cucumber).

1. Collection of samples: A total of 60 samples were obtained from 60 restaurant at temperature 35°C-37°C in summer. The food samples were taken from restaurant in sterile plastic bags in Ice-Box, according to Chessbrough (1984)

2. Preparation of food samples: From each sample 25 g was aseptically weighed and macerated and 225 mls of sterile distilled water was added. Sterile dilution was carried out using sterile distilled water as diluents. From each dilution 1 ml was plated using the pour plate methods of Swanson et al. (1992).

3. Isolation of Bacteria: Samples were cultivated on different media. The inoculated media were cultured at different temperatures. Pure cultures of the microorganisms were identified using the standard

procedures of (Barrow and Feltham, 1993). The test employed for the identification of isolates was the gram stain, biochemical test, pigments and colony morphology.

The streak plate method for the recovery of the various bacteria species. The Total Viable Count (TVC) of bacteria species was done on different media. The inoculated plates of bacteria were incubated at different temperatures 10°C, 20°C, 30°C, 40°C and 50°C for 24-48 hours. The colony forming units (CFU) were counted with a Gallenkamp colony counter, the result reported as (CFU) per ml of sample. The same process was repeated in respect of fungi and yeasts, which were incubated at (25-30°C).

I- Isolation of bacteria: The culture media used were

1. Nutrient agar medium: was used for total bacterial count (enumeration of bacteria). The medium containing (per liter of distilled water) according to *Atals, 1993 and Swanson et al., 1992*.

2. MacConkey agar medium: MacConkey agar is a differential and low selectivity medium used to distinguish lactose fermenting (e.g. *klebsiella* and *Escherichia coli*) from non lactose fermenting bacteria (*Pseudomonas aeruginosa*, *Salmonella* species and *Proteus mirabilis* (Oxoid 1992).

3. Salmonella-Shigella agar medium: was used for isolation of *Salmonella* and *Shigella* and incubation at 35°C for 24-48 hours (Feng et al., 2007).

4. Violet red bile agar: was used to distinguish coliform bacteria, and Eosin-Methylene blue Agar (EMB) was used for isolation of *Escherichia coli* (Oxoid, 1992).

5. Mannitol salt agar: Mannitol salt agar is a differential and selective plate medium used to isolate *Staphylococcus aureus*. The medium is available in dehydrated form Oxoid Ltd. Mannitol is fermented by *Staphylococcus aureus* (yellow in medium) (*Finegold and Martin, 1982*).

6. Staphylococcus medium (No. 110): Staphylococcus medium used for isolation of *Staphylococcus* spp. and *Micrococcus* spp. (gram +ve bacteria) according to (*Matthews et al., 1997*).

7. Rosef broth: *Campylobacter* strains were grown in stationary cultures in 5 ml of Rosef broth without antibiotics for 48 hours in anaerobic atmosphere created by using BBL gas peak plus anaerobic system envelopes without the palladium catalyst (Ryan and Ray, 2004).

Clostridium perfringens were grown in a stationary culture in an anaerobic atmosphere and subsequently diluted in sterile Rosef broth or sterile

saline to concentrations of 10^6 to 10^8 CFU per ml (*Baumgart et al., 2007*).

8. MRS Broth (de Man, Rogosa and Sharpe): Lactobacilli bacteria were counted with M.R.S. agar medium according to (Laner and Kandier, 1980). After incubation, colonies that developed on the plate were counted. The plates with between 30 and 300 colony recorded as colony forming units [total viable count (CFU/ml)]. Pure cultures of the isolates were obtained by subsequent sub culturing on fresh agar plates.

Identification of microbial isolates:

Isolates of bacteria were identified by the API 20E system following the method adapted by *Collins et al. (1995)*. This was done based on cultural, morphological and biochemical characteristics of the isolates, the method of bacterial classification, was the gram stain method, as described by Barrow and Feltham, 1993 and Bergey's (1989).

II- Isolation and identification of fungi

The purpose of screening was to isolate potent pure cultures from different samples of fast and traditional foods. Test-samples were plate on the surface using the dilution plate method Swanson et al., 1992) using (1) Sabourauds Dextrose agar (SDA) (2) Potato Dextrose agar (PDA). Identification to the genus level was carried out throughout macroscopic and microscopic examination, followed by more accurate identification to the species level according to John (1979), Domsch et al. (1993) and Robert et al. (2008).

III- Isolation of yeasts: Yeasts were isolated from samples of traditional and fast foods by using the dilution plate method of Swanson et al. (1992), media were used (1) Peptone Yeast molt agar (PYM), (2) Dextrose-Yeast broth (DYB), (3) Nutrient agar (NA). Yeasts isolates were identified according to (Arex, 1981; Barnett et al., 2000).

Statistical analysis:

Statistical analysis was carried out using statistical program SAS (1988). Duncan's multiple range tests was used to separate means.

3. Results

(1) Microorganisms isolated from traditional foods samples: The results of isolation of some species of microorganisms from 60 food samples collected from different 60 restaurants at El Qassim revealed that, a total of twenty two species in eighteen genera of bacteria were isolated. A fourteen species in twelve genera of fungi. A three species of three genera of yeasts

were isolated are recorded in table (1, 2 and 3).

Table (1): Bacteria isolated from traditional foods

No.	Sample	Bacteria isolated from samples
1	Jarish	<i>Escherichia coli</i> , <i>Lactobacillus plantarum</i> , <i>Pseudomonas putrefactens</i> , <i>Streptococcus thermophilus</i> .
2	Mataziz	<i>Acetobacter sp.</i> , <i>Erwinia carotovora</i> , <i>Micrococcus sp.</i> , <i>Pseudomonas aeruginosa</i> , <i>Staphylococcus aureus</i> , <i>Clostridium perfringens</i>
3	Qursan	<i>Acetobacter sp.</i> , <i>Escherichia coli</i> , <i>pseudomonas aeruginosa</i> , <i>Erwinia carotovora</i> , <i>Lactobacillus sp.</i> ,
4	Keshta	<i>Klebsiella pneumoniae</i> , <i>Micrococcus sp.</i> , <i>Staphylococcus aureus</i>
5	Mathabib	<i>Bacillus subtilis</i> , <i>Flavobacterium sp.</i> , <i>Klebsiella pneumoniae</i> , <i>Micrococcus sp.</i> , <i>Pseudomonas aeruginosa</i> , <i>Microbacterium lacticum</i> , <i>Leuconostoc mesenteroides</i> .
6	Freek	<i>Bacillus subtilis</i> , <i>Listeria monocytogenes</i> , <i>Proteus vulgaris</i> , <i>Micrococcus sp.</i> , <i>Pseudomonas putrefactens</i> , <i>Staphylococcus aureus</i> .
7	Hunayni	<i>Bacillus coagulans</i> , <i>Micrococcus sp.</i> , <i>Pseudomonas fluorescens</i> , <i>Staphylococcus aureus</i>
8	Saliq	<i>Escherichia coli</i> , <i>Listeria monocytogenes</i> , <i>Lactobacillus plantarum</i> , <i>Micrococcus sp.</i> , <i>Achromobacter sp.</i> , <i>Staphylococcus aureus</i> , <i>Streptococcus lactis</i> .
9	Harees	<i>Flavobacterium sp.</i> , <i>Micrococcus sp.</i> , <i>Staphylococcus aureus</i> .

Table (2): Fungal species isolated from traditional foods

No.	Sample	Fungal species
1	Jarish	<i>Aspergillus niger</i> , <i>Alternaria sp.</i> , <i>Fusarium sp.</i> , <i>Neurospora sp.</i>
2	Mataziz	<i>Penicillium expansum</i> , <i>Cheotomium candidum</i>
3	Qursan	<i>Aspergillus glaucus</i> , <i>Penicillium expansum</i> , <i>Neurospora sp.</i> , <i>Cheotonium candidum</i> , <i>Mucor rouxii</i> , <i>Alternaria sp.</i>
4	Keshta	<i>Penicillium expansum</i> , <i>Rhizopus nigricans</i>
5	Mathabib	<i>Aspergillus niger</i> , <i>Cladosporium herbarum</i> , <i>Penicillium sp.</i>
6	Freek	<i>Aspergillus glaucus</i> , <i>Cladosporium herbarum</i> , <i>Monilia sp.</i> , <i>Rhizopus nigricans</i>
7	Hunayni	<i>Alternaria sp.</i> , <i>Thamnidium elegans</i>
8	Saliq	<i>Sporotrichum carnis</i> , <i>Penicillium sp.</i>
9	Harees	<i>Alternaria sp.</i> , <i>Penicillium sp.</i> ,

Table (3): Yeast species isolated from traditional foods

No.	Sample	Yeast species
1	Jarish	<i>Torulopsis caroliniana</i>
2	Mataziz	-
3	Qursan	<i>Torulopsis caroliniana</i>
4	Keshta	<i>Saccharomyces rouxii</i> , <i>Torulopsis caroliniana</i> , <i>Zygosaccharomyces sp.</i>
5	Mathabib	<i>Torulopsis caroliniana</i>
6	Freek	<i>Torulopsis caroliniana</i>
7	Hunayni	<i>Saccharomyces rouxii</i> , <i>Torulopsis caroliniana</i>
8	Saliq	<i>Torulopsis caroliniana</i> , <i>Saccharomyces rouxii</i>
9	Harees	<i>Torulopsis caroliniana</i>

(2) Bacteria isolated from fast foods samples: The results of isolation of bacteria from 15 fast food samples collected from 15 restaurants at El Qassim revealed

that a total ten species of ten genera were isolated (table 4).

Table (4): Bacteria isolated from different fast foods

Type of sample	Bacteria isolated from samples
Chicken Shawarmas	<i>Campylobacter jejuni</i> , <i>Escheirchia coli</i> , <i>Listeira monocytogenes</i> , <i>Salmonella sp.</i>
Hamburger (beef burger)	<i>Listeria monocytogenes</i> , <i>Salmonella sp.</i> , <i>Staphylococcus aureus</i> , <i>Yersinia sp.</i>
Flafel with salads (Lettuces, Tomato, Cucumber)	<i>Campylobacter jejuni</i> , <i>Escherichia coli</i> , <i>Listeria monocytogenes</i> , <i>Salmonella sp.</i> , <i>Pseudomonas aeruginosa</i> , <i>Citrobacter freundii</i> , <i>Proteus vulgaris</i> , <i>Bacillus subtilis</i>

(3) Effect of different temperatures on isolated bacteria: The occurrence of isolated bacteria at different temperatures (isolated from traditional foods and fast foods) at 10°C, 20°C, 30°C, 40°C and 50°C (table 5 and 6).

Table (5): Occurrence of bacteria at different temperatures isolated from traditional foods from different restaurants

No.	Bacterial species	Temperature				
		10°C	20°C	30°C	40°C	50°C
1	<i>Acetobacter sp.</i>	-	+	+	-	-
2	<i>Acrhomobacter sp.</i>	+	+	-	-	-
3	<i>Bacillus coagulans</i>	+	+	+	+	+
4	<i>Bacillus subtilis</i>	+	+	+	+	+
5	<i>Clostridium perfringens</i>	-	-	-	-	+
6	<i>Erwinia carotovora</i>	-	+	+	+	-
7	<i>Escherichia coli</i>	+	+	+	+	+
8	<i>Flavobacterium sp.</i>	+	+	+	-	-
9	<i>Klebsiella (Aerobacter) pneumoniae</i>	-	+	+	+	-
10	<i>Lactobacillus plantarum</i>	+	+	+	-	-
11	<i>Leuconostoc mesenteroides</i>	-	+	+	-	-
12	<i>Listeria monocytogenes</i>	+	+	+	+	-
13	<i>Microbacterium lacticum.</i>	-	+	+	+	+
14	<i>Micrococcus sp.,</i>	+	+	+	+	-
15	<i>Proteus vulgaris</i>	-	-	-	-	+
16	<i>Pseudomonas aeruginosa</i>	-	+	+	+	-
17	<i>Pseudomonas fluorescens</i>	+	+	-	-	-
18	<i>Pseudomoas putrefactens</i>	+	+	+	+	-
19	<i>Salmonella sp.</i>	-	-	+	+	-
20	<i>Staphylococcus aureus</i>	+	+	+	+	+
21	<i>Streptococcus lactis</i>	+	+	+	-	+
22	<i>Streptococcus thermophilus</i>	-	+	+	+	+

Table (6): Occurrence of bacteria at different temperatures isolated from fast foods from different restaurants

No.	Isolated bacterial species	Temperature				
		10°C	20°C	30°C	40°C	50°C
1	<i>Campylobacter jejuni</i>	-	+	+	+	-
2	<i>Escherichia coli</i>	-	+	+	+	-
3	<i>Listeria monocytogenes</i>	+	+	+	+	-
4	<i>Salmonella sp.</i>	-	-	+	+	-
5	<i>Staphylococcus aureus</i>	-	+	+	+	-

6	<i>Pseudomonas aeruginosa</i>	+	+	+	+	-
7	<i>Citrobacter freundii</i>	-	+	+	+	-
8	<i>Proteus vulgaris</i>	+	+	+	+	-
9	<i>Bacillus subtilis</i>	+	+	+	+	+
10	<i>Yersinia sp.</i>	+	+	+	+	-

4) Fungi isolated from fast foods samples: The results of isolation of fungi from 15 fast food samples collected from 15 restaurants revealed that eight species of seven genera were isolated (table 7).

Table (7): Occurrence of fungi isolated from different fast foods at 25°C

No.	Isolated fungal species	Temperature		
		Chicken shawarma	Beef burger	Flafel with vegetable salads
1	<i>Aspergillus fumigatus</i>	-	+	+
2	<i>Aspergillus niger</i>	-	-	+
3	<i>Mucor sp.</i>	+	-	-
4	<i>Rhizopus nigricans</i>	-	-	+
5	<i>Trichoderma sp.</i>	-	-	+
6	<i>Alternaria sp.</i>	+	-	+
7	<i>Penicillium sp.</i>	-	+	-
8	<i>Cladosporium sp.</i>	-	+	-

The total bacterial count from traditional foods: In the present study the restaurants were chosen because of people in these localities are more exposed to pathogenic fungi, bacteria, yeasts which may transmitted to them from foods, soil or hands of workers and also from person to another. The total bacterial count was higher in food samples from Mathabib, Jarish and Qursan than those from samples from Hunayni, Mataziz and Keshta. The total bacterial count was lower in food samples from Freek and Saliq and the lowest number shows from Harees (table 8).

Table (8): Total viable count of bacteria from traditional samples

No.	Sample	Total viable count (Log 10 cfu/gm)
1	Jarish	5.20
2	Mataziz	5.07
3	Qursan	5.20
4	Keshta	1.02
5	Mathabib	5.38
6	Freek	0.94
7	Hunayni	5.15
8	Saliq	0.94
9	Harees	0.59

cfu: colony forming unit

Table (1) shows the bacteria isolated from traditional foods include *Acetobacter sp.*, *Achromobacter sp.*, *Bacillus coagulans*, *Bacillus subtilis*, *Clostridium perfringens*, *Escherichia coli*, *Erwinia carotovora*, *Flavobacterium sp.*, *Klebsiella pneumoniae*, *Lactobacillus plantarum*, *Lactobacillus sp.*, *Listeria monocytogenes*, *Micrococcus sp.*, *Microbacterium lacticum*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *P. fluorescens*, *Pseudomonas putrefactens*, *Staphylococcus aureus*, *Streptococcus lactis*, *Streptococcus thermophilus* and *Leuconostoc mesenteroides*.

The total bacterial count from fast foods: Bacteria of this group of fast foods samples may cause disease to man. Bacteria isolated include *Campylobacter jejuni*, *Citrobacter freundii*, *Bacillus subtilis*, *Escherichia coli*, *Listeria monocytogenes*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Salmonella sp.*, and *Yersinia sp.* (Table 4).

On the other hand we can divide the isolated bacteria from fast and traditional samples into:

1. Gram negative bacteria: isolated from traditional foods and fast foods are: *Campylobacter Jejuni*, *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella sp.*, *Yersinia sp.*, *Proteus vulgaris*, *Acetobacter sp.*, *Flavobacterium sp.*, *Pseudomonas aeruginosa*, *Citrobacter freundii*, *Erwinia carotovora*, *Pseudomonas fluorescens*, *pseudomonas putrefaciens*, *Achromobacter sp.*

2. Gram positive cocci: Isolated from traditional foods and fast foods are: *Leconostoc mesenteroides*, *Micrococcus sp.*, *Staphylococcus aureus*,

Streptococcus Lactis and *Streptococcus thermophilus*.

3. Gram positive rode, non sporing: *Listeria monocytogenes* and *Lactobacilli plantarum* were isolated from traditional foods and fast foods.

4. Gram positive rods irregular, *nonsporing*: *Microbacterium sp.* isolated from traditional foods only.

5. Gram-positive rods and cocci (endospores): Isolated from traditional foods and fast foods are:

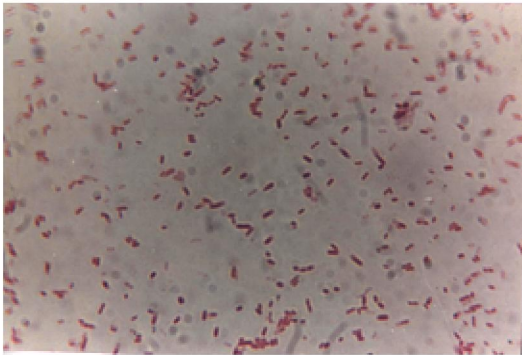
Bacillus coagulans, *Bacillus subtilis*, *Clostridium perfringens*. Regarding traditional foods and fast foods sharing in some bacteria as *Escherichia coli*, *Bacillus subtilis*, *Listeria monocytogenes*, *Pseudomonas aeruginosa*, *Salmonella sp.* and *Staphylococcus aureus*. Concerning fast foods, *Campylobacter jejuni*, *Proteus vulgaris*, *Citrobacter freundii* and *Yersinia sp.* the isolated species which not isolated from traditional foods.

It was noticed that the samples of traditional foods included many bacteria not isolated from the samples collected from fast foods such as *Clostridium perfringens*, *Acetobacter sp.*, *Bacillus coagulans*, *Erwinia carotovora*, *Flavobacterium sp.*, *Klebsiella pneumoniae*, *Lactobacillus plantarum*, *Leconostoc mesenteroides*, *Microbacterium lacticum*. *Micrococcus sp.*, *Pseudomonas Fluorescens*, *Pseudomonas Putrefaciens*, *Streptococcus*, *Lactis*, *Streptococcus thermophilus* and *Achromobacter sp.*

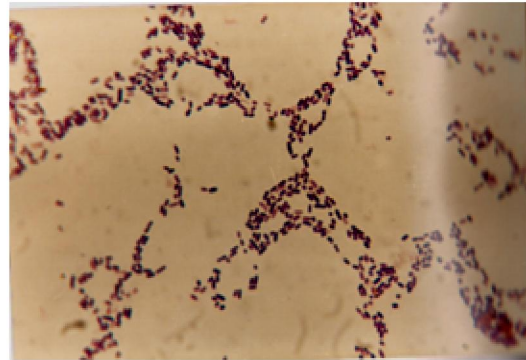
Matching the results recorded in table (1) with the results recorded in table (4), it was noticed that many species of pathogenic bacteria were isolated from traditional foods and fast foods causing many diseases for human (Fig. 1).

Type of sample	Total count of bacteria (Log 10 cfu/gm)
Chicken shawarmas	5.28
Beef burger	5.53
Flafel with vegetable salads (lettuces, tomato, cucumber)	5.76

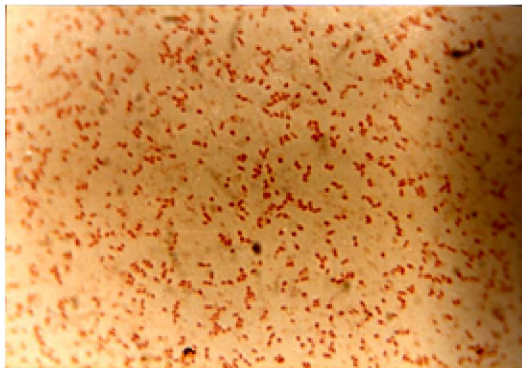
cfu: colony forming unit



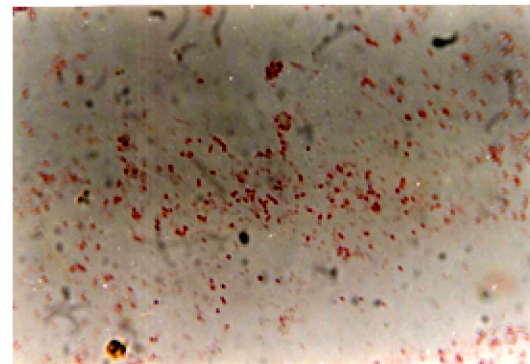
Culture smear of *Salmonella* sp. (x 1000)



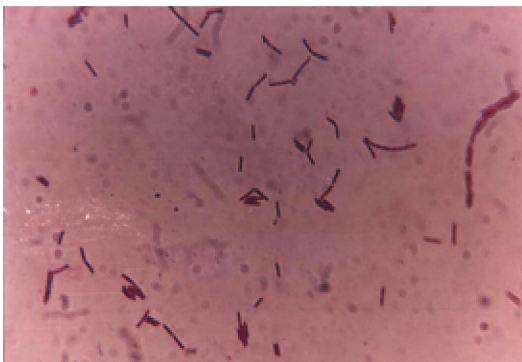
Culture smear of *Yersinia* sp. (x 1000)



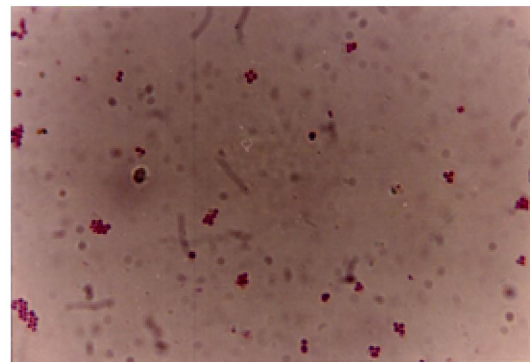
Culture smear of *Klebsiella pneumoniae* sp. (x 1000)



Culture smear of *Flavobacterium* sp. (x 1000)



Culture smear of *Pseudomonas* sp. (x 1000)



Culture smear of *Staphylococcus* sp. (x 1000)

ds

Isolation of fungi: A- From traditional foods

Isolation and identification of fungi were performed those include *Alternaria sp.*, *Aspergillus niger*, *Aspergillus glaucus*, *Cheotomium candidium*, *Cladosporium herbarum*, *Fusarium sp.*, *Monilia sp.*, *Mucor rouxii*, *Neurospora sp.*, *Penicillium expansum*, *Penicillium sp.*, *Rhizopus nigricans*, *Sporotrichum carnis* and *Thamnidium elegans* (table 2).

B- From fast foods: The fungi isolated from fast foods samples include. *Alternaria sp.*, *Aspergillus fumigatus*, *Aspergillus niger*, *Cladosporium herbarum*. *Mucor sp.*, *Rhizopus nigricans*, *Trichoderma sp.*, *Penicillium sp.*, (table 7).

(5) Isolation of yeasts from traditional foods: In the present study yeasts were isolated from traditional food samples include *Saccharomyces rouxii*, *Torulopsis caroliniana* and *Zygosaccharomyces sp.*, as shown in table (3).

4. Discussion

As The effect of microorganisms on human health has been reported, the present study was performed to give information of the distribution and presence of pathogenic microorganisms in traditional fast foods and fast foods from different restaurants, that important to human and to discuss their role in the food poisoning and also the causation of many human diseases. Studies on isolation of pathogenic bacteria, fungi and yeasts from fast foods and traditional foods in this investigation indicated that some gram negative bacteria and gram positive bacteria were isolated recorded in table (1 & 4). The food bacteria of greatest important to human pathology are the most common causes of human infection and extensively widespread in the environment using fast foods. Our results are in agreement with the above studies and are supported by many researches (Kay et al., 1994). His findings are consistent with our results that revealed some pathogenic bacteria, fungi and yeasts were found in fast foods, traditional fast foods. Most investigators indicated that bacteria, fungi and yeasts may exert their pathogenic action either through infection of body, or as a source of toxic substances demonstrated in contaminated foods. The most common infections causing food poisoning and other diseases are those associated with contaminations due to fast foods and traditional fast foods (Kay et al., 1994).

More recent studies have focused attention on the food poisoning diseases due to several pathogenic microorganisms. Many diseases of human associated with contamination of fast and traditional fast foods. Many workers reported that raw food, especially meat, poultry and sea food, and their juices, can contain dangerous microorganisms, such as *Salmonella*,

Campylobacter, *Listeria* and *Escherichia coli*, which may be transferred onto other foods during food preparation and storage (Uyttendaele et al., 1999). Our work is in agreement with the above studies. In raw milk, the presence of lactic acid producing bacteria, under suitable conditions ferments the lactose present to lactic acid. The increasing acidity in turn prevents the growth of other organisms, or slows their growth significantly. During pasteurization however, these lactic acid bacteria are mostly destroyed (Christison and Ivany, 2006; Chen et al., 2007). These results are agreement with the results of our study.

Feng et al. (2007) reported that some microorganisms are harmful and cause disease while others are benevolent neutral, or even helpful. Some help us to produce certain foods (e.g., *Streptococcus lactis* to make butter milk break down toxins in our environment, while others can sick us (e.g., contaminants in food like *Escherichia coli* or *Salmonella*), or can kill us for example, *Proteus* cause amoebic dysentery, fungi cause athlete's foot and ringworm, bacteria cause pneumonia, legionnaire's disease, streptococcus throat, tetanus and other diseases.

Some animal diseases bacteria can cause human disease with close animal-man contact. Some of these are *Brucella enteropathogenic E. coli*, *Corynebacteria*, *Mycobacterium*, *Leptospira*, *Coxiella burneti* and *Clostridium tetani*. Heaton and Jones (2008) suggested that *coliforms*, *E. coli*, *enterococci*, *S. aureus*, *C. perfringens* and *Salmonella* are often present on fresh tissues since slaughter process does not include a bacterial step. The frequency and levels of these bacteria will vary, depending upon farm, climatic, and processing conditions.

Recent studies indicated that *Staphylococcus aureus*, *Clostridium perfringens*, and *Salmonella* frequently are present in low numbers on raw meat surface *Clostridium botulinum* occurs infrequently.

As shown in table (10) pathogenic bacteria, important diseases and prevention of each disease were recorded to indicate the possible causative factor.

These species are most hazardous when they grow without competition as in cooked foods (Talarico et al., 1997; Baumgart et al., 2007). Our results are also in agreement with the previous studies. The hazard potential from foods precooked in commercial establishment is high but the incidence of outbreaks has been low. The Center for Disease Control reports that although more than half of all food borne disease outbreak can be traced to meat and poultry products, there was a serious departure from good practices at the serving level (homes, restaurants, institutions) in nearly all instances.

Table (10): Pathogenic bacteria, important diseases and prevention of each disease (bacteria isolated from fast and traditional foods)

Organisms	Where they be found	Important diseases	Prevention
<i>Campylobacter jejuni</i>	Contaminated drinking water and unpasteurized milk, contaminated food, with incorected prepared meat and poultry	Human gastroenteritis in the world, food poisoning, abdominal pain diarrhea, fever, and malaise	Treated with antibiotics in severe cases such as ciprofloxacin, erythromycin, azithromycin or norfloxacin
<i>Escherichia coli</i>	Food or water or with the individuals handling the infant's child, unwashed vegetables or undercooked meat, raw ground beef, raw seed sprouts, raw milk, unpasteurized juice, and foods contaminated, by infected food workers via fecal-oral route. Found in recreational waters and its presence is used to indicate the presence of recent fecal contamination	Most E. coli strains are harmless, but some can cause serious food poisoning in humans, and are occasionally responsible for product recalls, the harmless strains are part of the normal flora of the gut. Produce potentially lethal toxins, food poisoning, diarrhea in humans, rabbits, dogs, cats and horses, urinary tract infections	Cooking food properly, preventing cross-contamination instituting barriers such as gloves for food workers, pasteurization of juice or dairy products and proper hand washing requirements treated with antibiotics.
<i>Listeria monocytogenes</i>	Foods as raw milk, pasteurized fluid milk, cheeses, ice cream, raw vegetables, fermented raw meat sausages, raw and cooked poultry, raw meats (of all types), and raw and smoked fish and refrigerated foods. Isolated also from soil and silage.	It is the causative agent of listeriosis. It is one of the most virulent food borne pathogens with fatality rates exceeding even Salmonella and Clostridium botulinum. Gastrointestinal symptoms such as nausea, vomiting, and diarrhea	For gastrointestinal using antacids or cimetidine. May using also Vancomycin or Ampicillin Alcohol as an effective topical sanitizer or quaternary ammonium added to alcohol.
<i>Pseudomonas aeruginosa</i>	It is found in soil, water, skin flora, in normal atmospheres and also in little oxygen. This bacterium is also found on and in medical equipment including catheters, causing cross infections in hospital and clinics	It infects the pulmonary tract, urinary tract, burns wounds, and also causes other blood infections, gastrointestinal infection and external ear infection	Many antibiotics, for example, ear infections or nail infections, topical gentamicin or colistin may be used.

Table (10): Pathogenic bacteria, important diseases and prevention of each disease (bacteria isolated from fast and traditional foods) (Cont...)

<i>Salmonella sp.</i>	It can be transmitted by humans to animals and vice versa. Transmitted to humans by eating foods contaminated with animal feces. Contaminated food such as beef, poultry, milk, or eggs, any food including vegetables, food also become contaminated by the hands of an infected food handler who did not wash hands with soap after using the bathroom. The human pathogen of Salmonella abdominals transmission by contact and infected food, water or fly. Contaminated foodstuffs.	Diarrhea, fever, or abdominal cramps, food poisoning.	Food be heated for at least ten minutes at 75°C (167°F) so that the center of the food reaches this temperature. It is not destroyed by freezing.
<i>Staphylococcus aureus</i>	Part of the skin flora found in the nose and on skin. It presents in prepared foods left too long at room temperature (e.g., cooked hamburger, salads, dairy products).	It can cause skin infections, pneumoniae, meningitis osteom-yellitis, endocarditis, toxic shock syndrome, bacteremia and septicemia, food poisoning.	Treatment using penicillin, gentamicin
<i>Yersinia sp.</i>	Food products (especially vegetables, milk-derived products and meat)	Gastroenteritis	By oxidizing agents such as hydrogen peroxide and potassium permanganate solutions

Baumgart et al. (2007) showed that the heating step in the production of cooked cured meats destroys the typical raw meat flora except for the spores. Salt and nitrite in the cure inhibit the growth of survivors and contaminants somewhat selectively. These agreed with our results (table 9).

Rayan and Ray (editors) (2004) found that upon prolonged refrigeration, lactic acid bacteria, micrococci, enterobacteria, bacillus, and yeast may grow and form slime. If the product is in a tight, gas impermeable package, the package may swell. Products of bacterial action sometimes combine with meat pigments to form a green color. Human contact may sometimes introduce a few *Escherichia coli* or *Staphylococcus aureus*. These results are in agreement with our results. The food grade bacteria associated with food fermentation are capable of producing different types of metabolites they have antimicrobial properties (organic acids e.g., lactic, acetic propionic, aldehydes, ketones, and alcohols (ethanol, diacetyl and acetaldehyde), hydrogen peroxide, reuterine and bacteroides. It was reported that in the presence of the

mesophilic lactic acid bacteria (e.g., *Lactococcus lactis*, some *Lactobacillus* species, and *Pediococcus sp.*), the growth of psychrotrophic spoilage and pathogenic bacteria is reported to be controlled.

In refrigerated raw milk, meat, egg., and seafood, cells of *Lactobacillus*, *Lactococcus* and *Leuconostoc species* were added to control the growth of psychrotrophic spoilage bacteria such as *Pseudomonas spp.* The inhibitory property could be due to the release of antimicrobial compounds from the cells by the nonmetabolizing lactic acid bacteria.

It was reported that some strains of *Lactobacillus reuteri*, found in the gastrointestinal tract of humans and animals, produce a small molecule, reuterine that is antimicrobial against gram-positive and gram negative bacteria. It produces antibacterial action by inactivation some important enzymes such as ribonucleotide reductase. Many strains of species from genera *Lactococcus*, *Streptococcus*, *Leuconostoc*, *Pediococcus*, *Bifidobacterium*, and propionibacte used in food fermentation have been reported to produce different

bacteriocins (Daeschel and Penner, 1992).

Moreover, many organisms was found in our data is in agreement with many researches, several yeast isolates normally present on the surface of fruits and vegetables were reported to prevent spoilage of the products by molds. Some of the inhibitory compounds are small proteins, while some others are enzymes. It was reported that cells of one such yeast isolate were found to adhere tightly with the mold mycelia and produce B-gluconase that degrades the cell wall of the molds and kills them. As many of these yeasts are normally present in fruits and vegetables that are eaten raw, they are not consider pathogenic and thus human may be sick when eat it or when used in salads in fast foods or traditional foods (Barnett et al., 2000).

Uzeh et al. (2009) showed that decay caused by molds and certain bacteria accounts for much of spoilage of fresh fruits and vegetables. Many of these organisms are true plant pathogens in that they can invade healthy plant tissue. While bacterial rot is caused mainly by genus *Erwinia*, numerous mold such as *Alternaria*, *Botrytis*, *Phytophthora* are responsible for a variety of market diseases from these results above we can observed that our data is in agreement with them.

Bichai et al. (2008) showed that, the presence of *Escherichia coli* can be related to use of polluted irrigation waters during growth. Contamination through human handling, the use of contaminated containers, or washing after harvest with polluted water. It was suggested that it could increase the incidence of enteric pathogens (Angelillo et al., 2000). Thus products fresh or processed vegetables are the chapped salad ingredients (Lettuce, cabbage, carrots, tometo, cucumber...etc) sold in the grocery store and to the institutional trade (Kaneko et al., 1999).

Ali and Shalaby (1999) reported that biogenic amines are natural antinutrition factors and are important form a hygienic point of view as they have been implicated as the causative agents in a number of food poisoning episodes, and they are able to initiate various pharmacological reaction. Histamine, putrescine, cadaverine, tyramine, tryptam, B-phenylethylamine, spermine, and spermidine are considered to be the most important biogenic amines occurring in foods.

It was suggested that the beinge-eating of fast food can lead to measurable signs of liver injury and inflammation. The plentiful availability of relatively in expensive fat-and calorie-packed foods, has helped to make us the fattest. Fats which are commonly found in fast food have been shown in many tests to have a negative health effect on the body. It was suggested that fast food consumption has been shown to increase calorie intake, promote weight gain, and elevate risk for diabetes. A food may start with a pH which precludes bacterial growth but

as a result of the metabolism of other microorganisms (yeasts or molds), pH shifts may occur and permit bacterial growth (Hathcox et al., 1995 and Robert et al., 2008).

The interplay of factors affecting microbial growth in foods such as (water activity, pH, temperature) ultimately determines whether a microorganisms will grow in a given food. Often, the results of such interplay are unpredictable, as poorly understood synergism or antagonism may occur (Smith and Fratamico, 1995).

Richard et al. (2007) reported that some pathogenic bacteria cause sick for human when eat fast foods these bacteria such as: *Listeria monocytogenes* has been associated with such foods as raw milk, pasteurize fluid milk, cheeses,, ice cream, raw vegetables, fermented raw-meat sausages, raw and cooked poultry, raw meats (of all types), and raw and smoked fish. Its ability to grow at temperature as low as 0°C permits multiplication in refrigerated foods. In refrigeration temperature such as 4°C the amount of ferric iron promotes the growth of *L. monocytogenes* (Dharmarha and Vaishali, 2009; Farber and Peterkin, 2009).

Richard et al. (2007) showed that gastrointestinal disease has been reported by eating raw or inadequately cooked meat containing bacillus spores. *B. cereus* causes food poisoning by means of enterotoxins, reported that the prevention, because of the resistance of endospores to chemical disinfectants, autoclaving is the only reliable means of decontamination. *B. subtilis*, *B. coagulans* were isolated from traditional food samples (table 1) and (table 4) from fast food samples of our study.

Campylobacter jejuni is widely distributed in nature, it infects the intestine, where it can cause ulcerative, inflammatory lesions in the jejunum, ileum, or colon. It is the leading cause of food born disease. Diarrhea should be treated using fluids, if disease is severe ciprofloxacin is the drug of choice. Prevention by good hygiene avoiding contaminated water, pasteurizing milk and milk products, and thoroughly cooking potentially contaminated food (e.g., poultry). *C. jejuni* was isolated from fast food samples only (table 4).

Richard et al. (2007) also showed that *Clostridium perfringens* is part of the normal flora of the vagina and gastrointestinal tract. Its spores are found in soil. Acute food poisoning is caused by the generation of spores in improperly cooked food, resulting in the production of enterotoxin in the small intestine. Treatment of food poisoning requires only supportive care prevention of food poisoning is a matter of appropriate food handling practices. It was isolated from traditional food samples (table 1).

Feng et al. (2007) suggested that *Escherichia coli* is part of the normal flora in the colon of human and other animals, but can be pathogenic both within and outside the

gastrointestinal tract. Enterotoxigenic *E. coli* (ETEC), this organism is a common cause of "traveler's diarrhea" in developing countries, it infects only humans, with transmission occurring through food and water contaminated with human waste, or by person to person contact. Treatment and prevention by trimethoprim, sulfamethoxazole or ciprofloxacin are the drugs of choice and diarrhea can be prevented by taking precaution in food and water consumption, hand washing and disinfection. *E. coli* was isolated from traditional food samples (table 1) and from fast food samples (table 4).

AVI Biopharma (2008) suggested that *Pseudomonas aeruginosa* often includes identifying the production of both pyocyanin and fluorescein, as well as its ability to grow at 42°C. *P. aeruginosa* is capable of growth in diesel and jet fuel, where it is known as a hydrocarbon-utilizing microorganism (or HUM bug), causing microbial corrosion. It creates dark gellish mats sometimes called "algae" because of their appearance. Several studies indicated that *P. aeruginosa* is the common cause of infections of burn injuries and of the external ear (otitis externa), and is the most frequent colonizer of medical devices (e.g., catheters). However, research indicates that salicylic acid can inhibit pyocyanin production (Prithiviraj et al., 2005). *P. aeruginosa* widely distributed in nature (soil, water, plants, animals). *P. aeruginosa* can grow in distilled water, laboratory hot water baths, hot tubes, wet IV tubing, and other water containing vessels. This explains why the organism is responsible for so many nosocomial infections. This result is in agreement with our results. *P. aeruginosa* was isolated from traditional food samples and was isolated from fast food samples (table 1 and 4). Prevention and treatment by aminoglycoside antibiotic and an antipseudomonas lactam.

To protect against *Salmonella* infection, it is recommended that food be heated for at least ten minutes at 75°C (167°F) so that the center of the food reaches this temperature. *Salmonella* is not destroyed by freezing. It can survive several weeks in a dry environment and several months in water thus, they are frequently found in polluted water, contaminated from the excrement of carrier animals being particularly important (Administration Urged to Boost Food Safety, 2009; FDA/CFSAN-Food Safety, 2009). *S. typhi* is transmitted generally through food or water contaminated by human feces. Public food handlers or health care delivers who are carriers can present a serious public health problem. *Salmonella sp.* was isolated from fast food samples (Table 4). Our results goes with the previous studies.

Staphylococcal gastroenteritis is caused by ingestion of food contaminated with toxin produced by *Staphylococcus aureus* superantigen. Some strains of *S.*

aureus are capable of producing *staphyloxanthin* a carotenoid pigment that act as a virulence factor. It has an antioxidant action that helps the microbe to evade killing with reactive oxygen used by the host immune system. It is though that staphyloxanthin is responsible for *S. aureus* characteristic golden colour (Claudiz et al., 2006). It was reported that emphasis on basic hand washing techniques are therefore effective in preventing the transmission of *S. aureus*. The use of disposable aprones and gloves by staff reduces skin-to-skin contact that therefore further reduces the risk of transmission.

Recent reports have demonstrated that many researches showed that introduction of *Staphylococcus aureus* into the blood stream can lead to various complications including, but not limited to, endocarditis, meningitis, and if it is widespread, sepsis-toxins infecting the entire. From the above studies, our results are also in agreement with many researches (table 1 and 4). Exotoxins including enterotoxins cause food poisoning can preventing by infection control procedures such as barrier precautions, washing of hands and disinfection of fomites are important in the control of nosocomial staphylococcus epidermidis, aureus (Cosgrove et al., 2009).

Streptococcus lactis, *streptococcus thermophilus* were isolated from traditional food samples (table 1).

Yersinia species is endemic distributed worldwide. Infection is transmitted by fleas, the organism can also be transmitted by ingestion of contaminated animal tissues, or via the respiratory route *Y. pestis* was isolated from fast food samples (table 1). Some members of yersinia are pathogenic in humans, in particular, *Y. pestis* is the causative agent of the bubonic plaque. Rodents are the natural reservoirs of yersinia, less frequently other mammals serve as the host. Infection may occur either through blood (in the case of *Y. pestis*) or in an alimentary fashion, occasionally via consumption of food products (especially vegetables, milk-derived products and meat) contaminated with infected urine or feces (Ryan and Ray, 2004). These results were agreed with our results obtained. Yersinia may be associated with Crohn's disease, an inflammatory autoimmune condition of the gut by treatment and prevention by streptomycinis the drug of choice, gentamicin and tetracycline are acceptable alternatives.

For individuals in enzootic areas, efforts to minimize exposure to rodents and fleas is important. The above studies and discussion are in agreement with our research.

Barnett et al. (2000) reported that many mycotoxins found in various foods: *Aspergillus toxins*:

(a) Aflatoxins: *Aspergillus* and *Penicillium* sp. have been reported to produce aflatoxins, and the aflatoxins have been isolated from legumes, grains, fruits, meats, spices, cheeses, milk, rice, corn, cotton seeds, others compounds with carcinogenic, hemorrhagic, heptaotoxic, neurotoxic and uterotrophic properties have been isolated from food stuff and identified as metabolites of fungi common to a variety of agricultural commodities (Shank et al., 1972). (b) Ochratoxins: these substances are a group of closely related compounds produced by *Aspergillus ochraceus*, *A. sulphureus*, and *A. melleus*. *A. ochraceus* group is common in soils and decaying vegetation, grains, wheat, corn, cotton seeds, legumes, peppers, onions and pears (Adams and Moss, 2000). (c) Sterigmatocystin: another common food contaminant is *Aspergillus versicolor*, *A. nidulans*, a compound bearing some structural resemblance to the aflatoxins in that, it produces liver and kidney damage and is like the aflatoxin a hepatocarcinogen (Stack and Rodericks, 1973). (d) Other *Aspergillus* toxins: there are a number of other metabolites of this genus which have been shown to be toxic to animals, which are potential food contaminants.

Penicillium toxins: (a) Patulin: among the more important of the large number of mycotoxins produced by the penicillia is the potent antibiotic, patulin. Penicillic acid, rubrotoxin, and tremorgens and cyclopiazonic acid, that compounds elaborate a toxin and have potential carcinogenic agents (Harwig et al., 1973). (b) Rice toxins: Storage fungi proliferate in improperly stored rice. Most are of the genera *Aspergillus* and *Penicillium*, and about 10% of the isolates tested are toxigenic. The toxic effects of these substances interactions among them, and their natural occurrence have been reported (Saito et al., 1971). A polyenic compound called citreoviridin and an acidic compound known as citreomycin. Some of these toxins affect the liver and kidney, some are neurotoxic.

Fusarium toxins: (a) Zearalenone, trichothecenes (diacetoxyscirpenol) and other toxigenic fungi, their potential for human health effects is probably realized by growth of *Fusarium* sp. It was reported that it is probably one of the more common mycotoxin contamination of food and feed (Pelczar et al., 2006). (b) Trichothecenes: There are mold metabolites which have structural features similar to those of the compound known as diacetoxyscirpenol. The acute toxicity of some of mycotoxin trichothecenes cause hemorrhage on the lip and mouth, throat, and entire gastrointestinal tract.

International commission on microbiological specifications for foods (ICMSF, 1999) reported that there are hundred of fungal species which have been shown to be toxigenic from animal feeds, peanuts, and seeds, flour,

spaghetti, black and red peppers the following genera showed toxic isolates: *Alternaria*; *Cheotomium*, *Cladosporium*, *Curvularia*, *Gliocladium*, *Rhizoctonia*, *Scopulariopsis*, *Trichoderma*, *Trichothecium*. *Pithomyces chartarum* produce mold metabolites known as *sporidesmins* and *Rhizoctonia leguminicola* produce *Slaframine* causing diarrhea for animals.

ICMSF (1996) suggested that control of fungal toxin production can be occurred by the adjustment of pH, water activity, and temperature control. Temperature does not protect from all toxigenic molds, however, for many will grow at refrigeration temperatures (ICMSF) found several toxigenic species capable of growth and toxin production at temperatures down to 10°C. There is evidence that some strains may be more toxigenic at low temperatures than at optimum growth temperatures. Adjustment of water activity, is the best means of controlling growth of microorganisms in foods. e.g., *Campylobacter* cells when ingested with food or water, it enter the host intestine via the stomach and colonize the distal ileum and colon. The most effective means of eliminating human exposure to mycotoxins in foods is by the prevention of toxin formation. This requires agricultural and industry practices designed to reduce the opportunity for fungal growth from harvest to ultimate commodity use.

5. Conclusion:

The need for good hygienic practices, proper handling, storage and retail of salads in clean environment and at refrigeration temperature can not be over emphasized to ensure good quality and safe salads.

Prevention of mycotoxins must become a cooperative effort on the part of all involved in food production.

WHO's (2007) was reported that, it is important to handle food in such a way that the microorganisms present do not have a chance to multiply and to prevent food from becoming contaminated with other microorganisms by: (1) Wash and dry hands before preparing any food and after handling raw foods (meat, poultry, vegetables or fruits). (2) Ensure that food preparation areas and equipment are clean. (3) Protect kitchen areas or restaurants and food from insects, pests and other animals. (4) People with gastrointestinal illness, such as vomiting or diarrhoea, should not handle food intended for consumption by others.

We can also concluded that if people have meals regularly and in suitable quantities, there will not be any health problems, relating habits concerning to nutrition according to what the healthy nutritional experts specify, if all the society follow right nutritional habits, healthy foods, they have health.

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