

Consequences of Lack of Hygiene in Fast Food in The City of Oran

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ABSTRACT

In fast food, the most important factor is HYGIENE where several measures and precautions must be taken to avoid contamination of food for consumption. If the elementary rules of hygiene are neglected; it follows that the meals are considerable risks due to the possible presence of heavy metal residues and harmful microorganisms to the health of the consumer. The aim of study was to investigate the microbiological quality meals at fast food in four sites in Oran: M' dina Jdida (site A) and El-Hamri (site B), a popular districts restoring in the Centre town (site C) and finally a university canteen in Senia (site D).

Samples of food (cooked and served meals), surfaces, equipment and hands were made. Then, the study of some physicochemical parameters was carried out to search for and identify the germs that may deteriorate the quality of food (mesophile aerobic flora, total and faecal coliforms, sulphite-reducing anaerobes, *Staphylococcus aureus* and *Salmonella*).

The results obtained in the site (Site D) in the four studies showed good microbiological quality of foods unlike other ill-prepared and stored or located in areas not respecting the cold chain.

The results got for the university canteen (site D) showed a microbiological good quality of foods; with the difference in the 3 other sites where quality was unacceptable.

What gives the proof of a bad compliance with the rules of hygiene during the preparation or the storage? However, some recommendations would be essential to reduce environmental and health risks; by ensuring a rigorous and strict bacteriological monitoring to avoid possible collective food-borne illness due to bacterial contamination of food offered to consumers and by ensuring a workforce quality.

Keywords: Microbiology, Hygiene, Public Health, Catering, Pathogenic.

1. Introduction

In Algeria, the catering increases in scale particularly each day growing in academic world as the conditions of hygiene are not observed, it results from that the meals present a considerable risk because of possible presence of pathogenic microorganisms being able to involve a food poisoning for the consumer. So does the distribution of meal to the communities require a particular control in order to protect the consumers' health?

Takings of foodstuffs (ready-made meal with red and white meat and served to the consumers), of surfaces, equipments and hands, were made. Then, the study of some physico-chemical parameters were realized to look for and identify germs which can damage the quality of food (aerobic flora mesophile, coliforms total, faecal and anaerobic sulfite-reducers, aureus staphylococci and salmonella). The results (profits) should give an idea on the quality of the meals served in the various studied sites.

It is well known that the quality of food is an association of four components: hygienic, nutritional, hedonist and a quality of service (Abouda, 2011; OMS, 1989). The purpose of communal kitchens is to make a large number of well-defined meals. It is the place which must be organized to produce in warmth or cold; either menu balanced on a day, or dishes prepared for a main meal. Consequently, a policy of badly adapted hygiene can be translated only by an increase of the biological contamination with possibility of development of pathogenic microorganisms (Salmonellas, Streptococci, Clostridium, Coliforms, Staphylococci) with a big risk of food toxi-infection.

Indeed, the transfer to the food products of this microbial contamination can be carried out directly by simple contact or indirectly by a vector like the hand. The risk is raised for all surfaces and equipment known as "food". Currently, the catering includes three sectors: teaching (school restoration and academic), health and the social one (hospital restoration, old people's homes, penal institutions) and work (restoration of companies and administrations) and private restoration (Dillis, 2010). In Algeria, the catering increases in great scale each day. More striking is that some travelling merchants sell their dishes cooked on the roadway; on the level of the markets when the conditions of hygiene are not observed, it results from it that the meals present a considerable risk because of possible presence of pathogenic micro-organisms being able to involve a food poisoning for the consumer. The distribution of meal to the communities requires a particular control in order to protect consumers' health. Food of bad intended for consumption is a source of danger and can affect the whole of the organization. The origin of the foreign substances coming from the food (plant health manures and products), of the environment, treatments prescribed with the animal.

The security of food is thus the warranty that the food does not involve fatal consequences for the health of the consumer. It is important to know that the food and the service must answer the needs and waiting's of all. The consumer should not accept the fatal consequences for his health, because the aptitude of a product is well to nourish the man or the animal and does not cause any damage. The non-respect of the chain of cold can in serious consequences on the microbiological and biochemical quality of the meats and fishes (Table 1).

Table 1. Maximum temperatures of the frozen food products (Delaunay, 2011)

Nature of food products	Temperature of conservation at the stage of storage or transport	Temperature of conservation in the establishments of direct handing-over or catering
Minced meats and preparations of frozen meats	- 18 ° C	- 18 ° C
Fishery products frozen	- 18 ° C	- 18 ° C
Whole fishes frozen out of brine intended for the manufacturing of preserves	-9°C	-9°C
Other frozen foods tuffs	- 12 ° C	- 12 ° C

2. Materials and Methods

Our research task has been unrolled in 4 sites different from the town of Oran which is the 2nd Town (Department) after the capital “Algiers”. As for the microbiological and biochemical analyses, they were carried out at the Laboratory of Applied Microbiology in the University of Oran1 Ahmed Benbella.

2.1. Taking away

2.1.1 Test of sample selection of meat

The taking away of the red and white minced meat are carried out using a sterile knife and the samples are then packed individually in sterile bags. In general, the prepared meat (cooked) is quickly perishable, which requires a transport in a cooling system. For that, the taken samples are identified (code, date, site of collection) and are maintained under cold in an isothermic refrigerator and quickly transferred to the laboratory.

2.1.2 Taking away from surfaces by cleaning

To ensure a good taking away of samples of surfaces, equipment and hands of the staff which are in contact with food prepared or not; we used the wet method cleaning which is more effective than dry cleaning.

2.2 The Sampling

Samples were taken in 4 sites different from the town of Oran: M' dina Jdida (site A) and El-Hamri (site B), the popular district; restoring in the Centre town (site C) and finally a university canteen in Senia (site D). For each site, 10 samples were selected among those which were taken.



Fig. 1. Cooked Food made with minced meat (1. Gratin of minced red meat; 2. Gratin of minced white meat)

The meats (red and white) are cut out in small heaps, then crushed aseptically with scissors and sterile spatula. A balance with precision is used to take a weight of 1g of the broyat. Ten samples of meats red and white are treated by a mother solution. The latter corresponds to meat 1g diluted in physiological water 9 ml. From this solution, the decimal dilutions (going from 10^{-1} to 10^{-6}) in distilled water are prepared. The factor of dilution varies from a sample to another.

2.3. Microbiological analysis

All the bacteriological analysis is carried out according to the international standards of ISO, as for the enumeration of the micro-organisms in the intended products with human consumption. In this study, the culture media used are: PCA or "Punt Count Agar", (for the research and the enumeration of the flora mesophile aerobic total (FMAT), the agar of Chapman (for the search for Staphylococcus), the agar of Hektoen (for the research of the Salmonellas), the VRBL and the VRBG (for the enumeration of the total coliforms), BLBVB (enumeration of the faecal coliforms) and agar VF (for the enumeration of the anaerobes sulfite-reducers – ASR-). Once the enumeration of the aerobic flora mesophile total and the ensemencement realized, the reading is done according to the Algerian standards where each limp will have to contain more than 300 colonies and at least 15 colonies. After the incubation, a counting is carried out with the following formula:

$$N = \Sigma C (N1 + 0.1N2) / 2$$

N: number of micro-organism per gram of product,

C: nap of colonies counted on limp retained,

N1: number of limp retained with the 1st dilution,

N2: number of limp retained with the 2nd dilution,

D: the bypass ratio corresponding to the 1st dilution.

The number of germs/g counted is noted by a number ranging between 1 and 9.9×10^n where N is the adapted power of 10. The results are given in logarithm decimal of units forming colonies (Dutruc-Rosset, 2003; Larpent, 1997). As for the reading, the colonies appear round, colored in crimson from 1 to 2 mm in diameter, surrounded by the same colored aureole. The Counting of micro-organism is done by the method referred to above.

The research of the faecal coliforms with 45°C searching E.coli. That are usual germs of the digestive tract of man and animal consequently, in a frequent relationship to the faecal contamination origin. Its minimal value of development is generally in a temperature of 7°C; pH 5.4 and aw 0.35. The preparation of bile lactose makes it possible to detect the presence of some bacteria (Echerichia coli) and to count them . Staphilococcus are usually motionless and are divided into forming irregular clusters. They degrade the mannitol in acid, which makes transfer with the yellow pH indicator (red phenol). Then a microscopic observation is necessary.

3. Results and interpretations

Microbiological criteria applicable to the meats analyzed (red and white) according to the regulations, published in the Official journal of the Algerian Republic (JORA) n°35.

Figure: Aerobic flora mesophile total for a red sample of chopped meat (site A) on agar (PCA) after incubation during 72 H with 30° C With: presence of colonies; B: absence of colonies

The coliforms live normally in the intestine of the man and the warm-blooded animals. They are markers who can be an index of the presence of the pathogenic germs. the tubes are regarded as positive if they present at the same time: - A gaseous emission higher than 1/10 the height of the bell. - A microbial disorder accompanied by a turn of the pH indicator, which testifies to the fermentation of lactose present in the medium.

3.1. Aerobic flora mesophile total

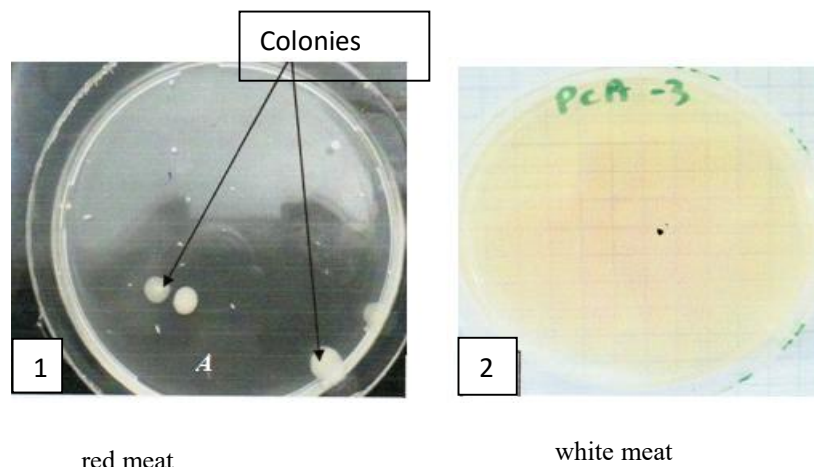


Fig.2. Aerobic flora mesophile total for a sample of minced meat (Site A) on agar (PCA) after incubation during 72 with 30° C (A: presence of colonies; B: absence of colonies)

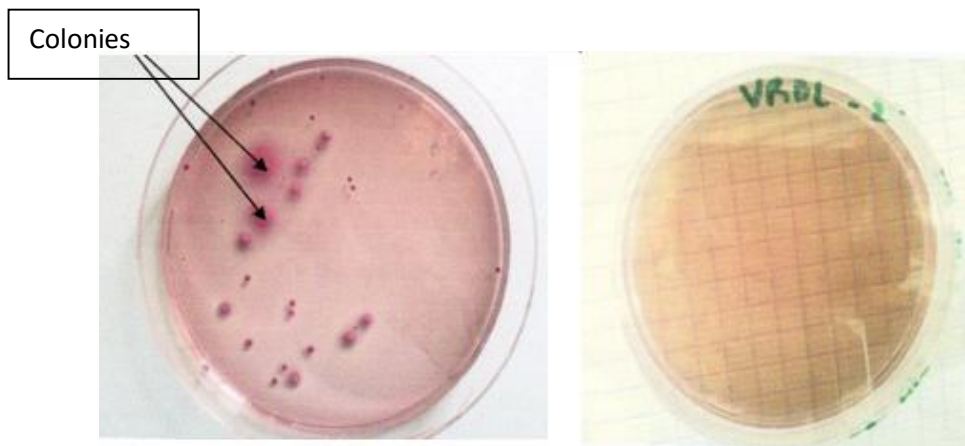


Fig.3. Results of the total coliforms (SiteB)

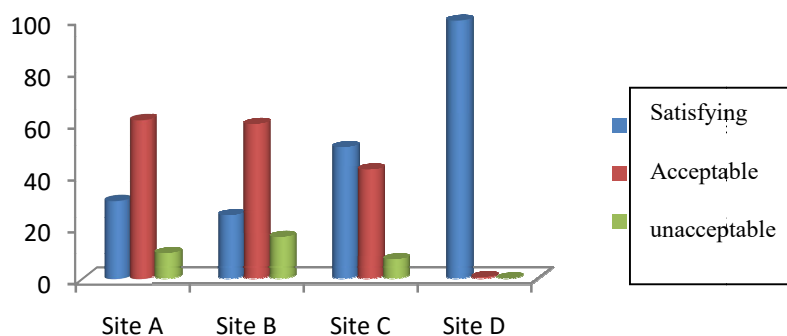
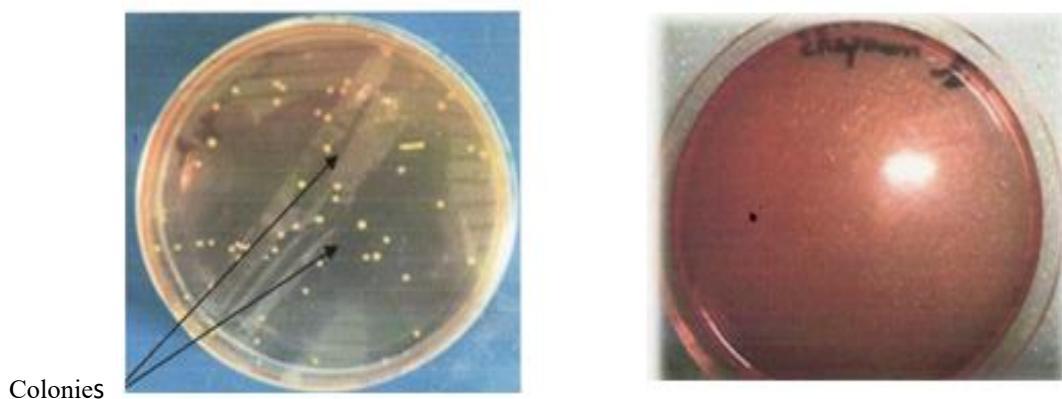


Fig. 4. The percentage of the contamination level by the total aerobic mesophile flora with 30°C in 4 sites



Colonies

Fig.5. An Illustration of the presence of colonies of *Staphylococcus aureus* in Chapman (to the Right red meet , to the left white meet

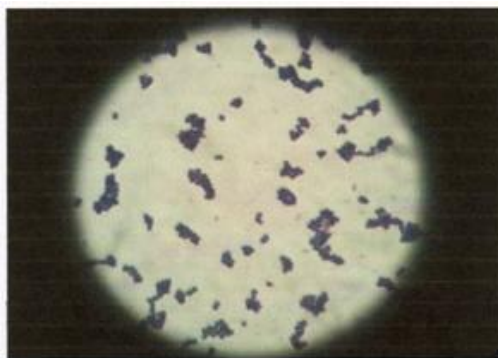


Fig.6. microscopic view of *Staphylococcus aureus* (Gx100)

Table 1 Microbiological: analysis of the samples of surfaces and hands which were taken in place C.

Taking away	Required germs		
	<i>CF.Faecal</i>	<i>S.Aureus</i>	<i>Salmonella</i>
Hands of cook	-	+	-
Hands of distributors	-	+	-
Cloakrooms of cook	+	+	-
Dishes of consumption	-	+	-
Stations of distributions	+	+	-
Straw mattresses of work	+	+	-
Equipment	-	+	-
Carriages	+	+	-

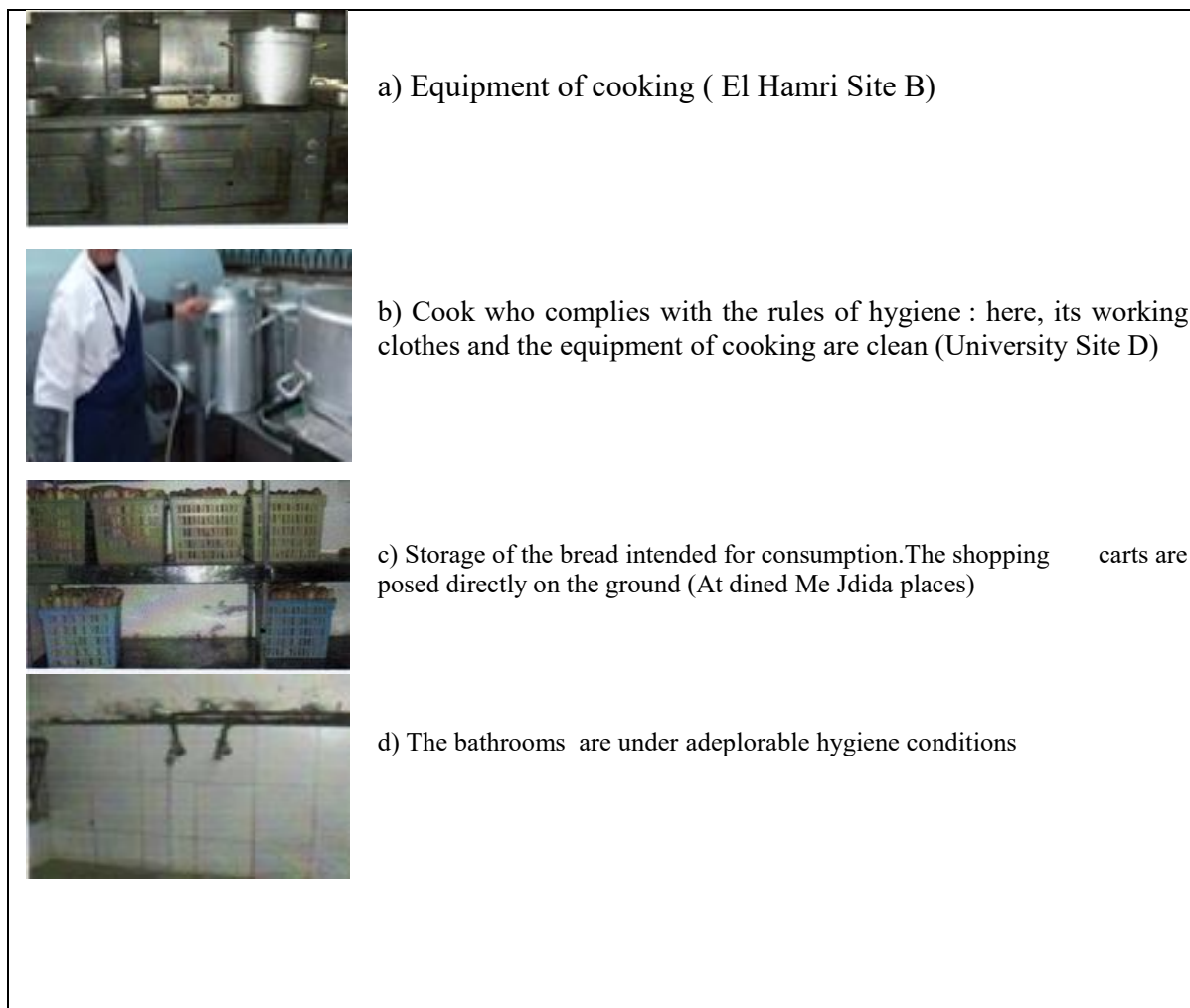


Fig.7. Conditions of hygiene in several restaurants

4. Discussion

Among the four restaurants that our study were conducted, only one restaurant (University, site D) showed a microbiological good quality of the red and white meat cooked dishes. On the contrary the same dishes cooked in the two popular districts have a non satisfactory or unacceptable microbiological quality. This maybe due to the badly made preparation, with a bad storage of the meats, the insalubrity of the places or the non compliance with the rules of hygiene of transport, distribution and conservation.

Several authors agree on the fact to protect the consumer against the serious consequences; it is necessary to practice the suitable techniques to secure food and handling of food. Food illnesses of that origin make thousands of death and hospitalizations (Yasuda, 2010). It is time that more researches to be carried out to determine with which point the negligence of the good practices of hygiene can be a danger to the health of the consumer (Ghezzi, 2011; JORA, 1990; JORA, 1991; JORF, 1974).

In our study, we observe the level of contamination in some sites (A and B) is worrying with FAMT Testifying of a total poor hygienic of the samples examined to the sites. This contamination is probably the consequence of an abundant microbial contamination resulting from the bad conditions of hygiene as of the manufacturing with transport with the conservation of the product.

The significant number of faecal streptococci can be due to the enormous multiplication of the faecal flora present initially in the meat during its preparation under deplorable hygienic conditions. These environmental conditions allow the proliferation of the microflora. Only the rigorous hygienic conditions would eliminate this flora. According to Benkerroum, (2013), reported that the developed model by Health Canada uses eight risk factors. Our exposed results and various extrinsic and intrinsic factors intervening in the preparation of the meat dishes; one can classify the minced meat (red and white) among the products that are at the high risk for consumption in the popular restaurants (A and B). For this purpose, which require that our food can be without danger to our health?

It is necessary to avoid their contamination during the production of transformation, transport and handling by potentially dangerous substances (Panisset et al., 2003). The contamination of food is the first condition which makes a product likely to make its consumer sick.

We distinguish several origins from contamination, the cooked dishes preserved by heat must be placed in the end of the cooking in containers provided and maintained with higher temperatures with 65° C. Cooked dishes preserved by cold, after preparation and conditioning ,are cooled with 10°C during 2 hours maximum delay, conditioning including .

As of the end of cooling, storage is done by refrigeration (0°C with 3°C) or put in freezing or deep freezing (lower or equalizes with 18°C).

5. Conclusions

This study revealed that on the level of the service of four restorations in the town of Oran, it would be necessary to improve installation and the equipment in the kitchens. In addition it would urgently be necessary to train staffs of restoration, which often are unaware of the elementary rules of hygiene. It is imperative to ensure of food practices of hygiene since the condition of the meal, until its distribution by avoiding possible recontaminations by various vectos, and finally to strengthen the installation and the control of a programme of cleaning-disinfection of the buildings. As for the sale of the meals on the roadway, it would have a strict control in order to be prohibited.

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