

Quality and quantity microbial assessment of the mobile restaurants (caravans) in Baghdad

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Abstract:

Background: In Iraq, the fast food mobile restaurants have grown tremendously in the last ten years especially in Baghdad. Every major City in Iraq, is flooded with fast food restaurants. Microbial pathogens control in fast food production poses several challenges.

Objective: Although Research indicates that food safety is not a factor which influences the public's choice when selecting an eating establishment, the detection and characterization of pathogens in food is very important in the control and prevention of food poisoning outbreak.

Methods: Bacteriological analysis of was conducted on ten samples of food obtained from mobile restaurant in Baghdad City. All of them were made of ground beef. Samples were culture on Nutrient agar, Salmonella- Shigella agar, Manitol salt agar. Ten grams of each food were blended in a sterile blender with 90ml of normal saline for two minutes. Ten fold serial dilution were prepared and one ml of the relevant dilution was inoculated onto duplicate plates of the already prepared media using the pour plate technique. The plates incubated at 37C for 24-48 hrs. and examined for colony formation after incubation, colony counter were used to count colony, the colonial counts recorded as CFU/g.

Results: Bacterial species isolated in this study include: (*Staphylococcus aureus*, and *salmonella* spp.). The presence of food-borne pathogens beyond the acceptable limit of public Health importance. *Salmonella* spp. was recorded positive among five samples, while *Staphylococci aureus* was recorded among four samples only.

Conclusions: This work is therefore aimed at determining the microbiological quality from fast food restaurants in Baghdad City, Iraq.

Keywords: Microbiological Assessment, Mobile Food Restaurants, Baghdad City.

INTRODUCTION:

Hamburger is one of the most popular fast foods, which carries considerable amount of meat all over the world. After production, Hamburger patties are mainly being kept cold or frozen until they were used in many restaurants (1). The main raw material is minced beef, though fat and other ingredients may be included. (2,3). Microbial pathogen control in hamburger patty production poses several challenges. Ground meats are a troublesome source of food borne infection. Intensive handling and complex preservation issues in preparation promote pathogen growth and transmission (2). Grinding operations typically take raw beef trimmings from multiple sources and mix these inputs together to make patties. Meat trimmings may carry high pathogenic loads because of how they are being handled and because they have multiple exposed surfaces. The grinding operation itself disperses pathogens present on the trimmings throughout the ground product and there is opportunity for those pathogens to multiply in the subsequent supply chain. The primary method of destroying pathogens in hamburger patties is to cook them to a proper internal temperature (4). USDA recommend slowest heating points for hamburger patties of 71.10C/1600F (5) or 700C for 2min (6). Although research indicates that food safety is not a factor which influences the public's choice when selecting an eating establishment (7), the detection and characterization of pathogens in food is very important in the control and prevention of food poisoning outbreaks. This work is therefore aimed at determining the bacterial quality of Hamburger patties from fast food restaurants in Baghdad City, IRAQ.

MATERIALS AND METHODS:

A total number of Ten fast food sample (uncooked Hamburger patties of beef) were bought from Ten fast food restaurants in Baghdad City, the samples were immediately transported to the laboratory of Market Research and Consumer Protection Center / Baghdad university in well wrapped, clean, sterile aluminum foil. (Table 1)

Nutrient agar, Salmonella shigella agar, Mannitol Salt agar, Eosin Methylene blue agar, were prepared according to manufacturer's instruction and sterilized by autoclaving at 121 °C for 15mins. Ten grams of each sample was blended in a sterile blender with

90mls of normal saline for two minutes. Ten fold serial dilutions were prepared and 1ml of the relevant dilutions was inoculated onto duplicate plates of the already prepared media using the pour plate technique. The plates were then incubated at 37 °C for 24-48h and examined for colony formation. After incubation, colonies were counted using a colony counter (Gallencamp) and then the colonial counts recorded as cfu/g were converted to log 10 cfu/g. Pure cultures of isolates were obtained by sub-culturing in fresh medium using the streak plate method. Bacterial isolates were identified based on standard microbiological cultural, morphological and biochemical characteristics as described by Cowan and (8,9,10). The characteristics and biochemical tests include; Gram reaction, endospore staining, catalase, urease, coagulase, citrate, oxidase test, sugars fermentation test, methyl red-Voges proskauer and indole tests.

Table1: Collected fast food samples from Baghdad city

No	Sample Name	origin	gram
1	King Burger	Iraq	150
2	Fast food	Iraq	150
3	Sheaf Burger	Iraq	150
4	Al-Koch Burger	Iraq	150
5	Queen burger	Iraq	150
6	Speed burger	Iraq	150
7	Alameer burger	Iraq	150
8	Taboosh burger	Iraq	150
9	Fire burger	Iraq	150
10	Manakish burger	Iraq	150

Statistical Analysis: Statistical significance was assessed by using least significant differences – LSD (T-test) *P* – value < 0.05 was considered significance.

RESULT:

Growth of *Salmonella* spp. was detected positive in five samples namely (king, fast, speed, alameer and fire burger (table 2). *Staphylococcus aureus* recorded a highest count in fast food (21×10^3) followed by Manakish burger (18×10^3) followed by Speed burger (14×10^1) and Taboosh burger (12×10^2)

Table (2): Isolation of microbial species identified in the fast food samples.

No	Trade Mark of meat samples	Total Count Bacteria CFU/g	Staphylococci CFU/g	salmonella CFU/g
1	King Burger	5×10 ²	3×10 ¹	positive
2	Fast food	13×10 ³	21×10 ³	positive
3	Sheaf Burger	6×10 ¹	11×10 ²	Nil
4	Al-Koch Burger	11×10 ³	8×10 ²	Nil
5	Queen burger	21×10 ³	11×10 ²	Nil
6	Speed burger	20×10 ³	14×10 ¹	positive
7	Alameer burger	12×10 ²	6×10 ¹	positive
8	Taboosh burger	24×10 ¹	12×10 ²	Nil
9	Fire burger	12×10 ²	9×10 ²	positive
10	Manakish burger	34×10 ³	18×10 ³	Nil

DISCUSSION:

The high bacterial load, though, within acceptable limits in samples can be attributed to what (11) described as some low level of contamination which occur during handling , packaging or serving of cooked products on surface of the product from equipment's and food handles.

Improper preparation and handing foods at food service establishments are primary factor. *Salmonella* outbreaks (12). *Staphylococcus aureus* recorded a highest count of CFu/g from fast food ,which might be attributed to low level of food hygiene practices (Table 2).The Presence of small number of *Staphylococcus aureus* is not uncommon (13).Human contact with cooked food invariably introduces *Staphylococcus aureus* of level 10¹ or 10² to many sample units. (14) .Such level are harmless but offer sufficient inoculums for growth. These organisms might be associated with the environment according to (11). Consumers often believe that a brown internal color indicates that the food is fully cooked . the food safety and inspection service the Food and Drug Administration and the Center for Disease Control and Prevention recommend that consumer use a thermometer to cook hamburger to (160F) (71C) with no reference to internal color (15).

CONCLUSION:

From this research it is evident that eating of hamburger patties might pose a health risk even though as yet there have not been any report of any outbreak assigned to its consumption in Iraq. However, to ensure the safety and health of their customers, fast-food restaurants should inculcate food safety practices and habits in their staff and food processing. The critical control points to

preventing food borne illness such as preventing cross contamination from the raw products Food handlers should also be trained on hygienic food handling practices and safety

REFERENCE:

- [1] Ahmed ,N.M.D., Conner ,E. and Huffman, D.I. (1995) Heat resistance of *Escherichia coli* 0157:H7 in meat and poultry as affected by poultry composition, *Journal of Food Science*, 60(3), , 600-610.
- [2] Fortuna ,J.L., Rosendo do Nascimento ,E. and Franco ,R.M. (2012) detection of *Salmonella* spp in Hamburgers: a comparison between modified standard and salmocyst method, *Internet Journal of Food safety*, 14, , 104-112.
- [3] Cowan ,S.T., and Steel K.J. (1965) *Manual for identification of bacteria* 2nd ed. (London: Cambridge University Press, , pp163-169
- [4] Nester,E.W.,Anderson,D.G.C.,R.Evans and Nester, M.T. (2008) *Microbiology : Human perspective* 5th ed.(New York: McGraw-Hill Colnc., Pp210-808
- [5] Clavero,M.R.S., Beauchat ,L.R. and Doyle ,M.P. (1998) Thermal inactivation of *Escherichia coli* 0157:H7 isolated from ground beef and bovine faeces, suitability of media for enumeration. *Journal of Food Protection*, 61(4), , 285-289
- [6] Johnstons ,R.W. and Tompkins ,R.B. (1992) *Meat and poultry products*. Compendium of methods for the microbiological examination of foods. (Washington, D.C: American Public Health Association, , pp821-835
- [7] Ciftcioglu,G.,Arun ,O.O., Vural, A. A. Aiydin and Aksu ,H. (2008) Survival of *E.coli* 0157:H7 in minced meat and Hamburger patties,*Journal of Food, Agriculture and Environment*, 6(1), , 24-27.
- [8] Hague, M.A., Warren ,K.E., Hunt ,M.C., Kropf ,D.H., Kastner C.L.(1994) Stroda ,S.L. and Johnson ,D.E., End point temperature, internal cooked color and expressible juice color relationships in ground beef patties. *Journal of Food Science*, 5, , 465-470.
- [9] Prescott, L.M., Harley ,J.P., and Klein,D.A. (1996) *Microbiology Laboratory Exercise* 3rd ed, (New York: Block Dot Inc. ; pp40-420
- [10] Surkiewicz ,B.F., Harris ,M.E. and Johnson ,R.W.(2000) Bacteriological Survey of frozen meat and gravy produced at establishments under Federal inspection, *Applied Microbiology*, 26(4), , 574-576
- [11] Killinger,K.M., Hunt,M.C.,Campbell ,R.E. and Kropf,D.H. (2000) Factors affecting premature browning during cooking of storepurchased ground beef, *Journal of Food Science*, 65(4), , 585-587.
- [12] Leach,J., Mercer,H., Stew,G. and Denyer,S. (2000) Improving food hygiene standards- a customer focused approach, *British Food Journal*, 3(4), , 238-252.
- [13] Speck, M.L..(2000) *Meat and poultry products*. Compendium of Methods for the microbiological examination of food. (Washington,D.C.: American Public Health Association, pp540-548
- [14] WHO.(2011)World Health organization for data and experts on public health risk of histamine and other biogenic amines from fish. Geneva . .
- [15] Mead,G.C.(2005) *Food safety control in the poultry industry*. Woodhead Publishing Limited ; USA.