Microbial evaluation of canned meat.

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Abstract

The study was conducted to evaluation 55 samples of canned meat (35 samples of canned beef and 20 canned fish).The samples were collected from local market at Basrah province.All samples tested for total viable bacterial count , *E.coli* , *Staphylo coccus aureus* count , Enterococcus, Psychrotropic bacteria , anaerobic and mould and yeast count .The study showed that the mean count of canned beef and fish 15.62×10^7, 2.54×10^3, 8.22×10^5, 22.027×10^5, 11.22×10^4, 1.742×10^3, 2.82×10^4 cfu/gm and 23.25×10^7, 6.75×10^3, 16.15×10^5, 10.35×10^5,13.02×10^4, 3.6×10^3,5.25×10^4 cfu/gm respectively. Also the study shown the percentage of coagulase test for *Staphylococcus aureus* 48.5% and 45% in canned beef and fish respectively.The research show no growth of an aerobic bacteria in samples test .

Introduction

Meat is consider as an essential food (1) it exposed to biological and chemical contamination and it regarded as a good medium for the growth of microorganism (2). Of all microorganism bacteria are the greatest importance ,some bacteria are not infectious on their own ,but when they multiply in food they eject toxin ,that poisons human when consumption.Also processing practices can exacerbated contamination through poor hygiene (3) (4) (5) canned food that have. Low acidity and are properly processed can still spoil if incubated at temperature greater than 37 C° *Esherichia coli* one bacteria indicators for the sanitary quality of food and if presence in great number give rise to public health hazards (6). *Staphylococcus* are wide spread in nature and recoverable form many inanimate source and Staph .coagulase – positive are capable of producing enterotoxins (7) the main source of *Staph .aureus* in relation to food poisoning outbreak is the preson preparing the food.All Mesophilic and Psychrotrophic bacteria form animal it self and from environment and can introduced during slaughter and processing of raw products (8).The objective of this study obtain the quantative and qualitative evaluation of microorganism of canned meat.

Materials and methods

A total of 55 samples of canned meat (35 beef and 20 fish)were colleted from local markets at Basrah province during four months (April-Julay)2005.The samples transferred to laboratory and kept tem in cold condition . peptone water used as diluent duplicate plate were culture from each dilution according to (9), each samples were examined for :

1- Total Viable Bacteria Count

One ml of aliquots of each dilution was transferred aseptically to sterile petri-plates and mixed with about 15 ml of nutrient agar tempered to 45-50Cº.The cooled plat were inverted and incubated at 37Cº for 48hr. Following the incubation the colonies on duplicate plates (Containing 30-300 colonies) were counted using the Quebec colony counter. The concentration of bacteria in the original sample was calculate by multiplying the number of colonies on a dilution plate by the corresponding dilution factor and the number of microbes were expressed as colony forming unites (CFU) per gram (9).

2- Total Escherichia coli count

A aliquots,0.1ml of appropriate dilution, was transferred on to the dry surface of prepared plates (induplicate) of Eosin methylen blue and spread with a sterile glass spreader, incubated at 37 Cº for 24hr. The colonies are shining metallic green bright (10) .

3- Staphylococcus count.

As mention a above use mannitol salt agar, and for testing pathogen city of *Staphylococcus auras* picking up 10

colonies these subjected to coagulase test (9).

❖ **Coagulse tube test:**

Rabbit plasma (0.3ml) placed in a small test tube with 0.1ml of an overnight brain heart infusion broth cuture of Staphylococcus.The tube is rotated gently to mix the contents and then incubated at 37 Cº. A positive test with clotting of the plasma can occur in 2 to 4 hr and or after overnight incubation (11).

4- Psychrotrophic count :

In the total viable bacterial count, the plate in cubated at 4Cº for ten day's . (9).

5- Enterococcus count :

As in *Escherichia coli* using McConeky agar, lactose fermentation or non fermentation bacteria and streptococcus SSP .(9)

6- An aerobic bacteria count :

0.1ml of a aliquots of each dilution cultural on blood agar and put in anaerobic jar, in cubated at 37 Cº for 38hr.

7- Mould and yeast count:

1ml of aliquots of each dilution transferred to sterile duplicate petri- plates and mixed with sabvoud dextrose agar, the plate incubate at 22 Cº for 7 days (12).The microorganism diagnosed depending on (13) :

Result and discussion

Commercially canned food are considered safe because they are processed under carefully controlled conditions. If canned food shows signs of spoilage bulging can ends , leakage spurting liquid ,off –odor or mold do not use it. Canned meat may contain toxin if not properly processed. Table (1) showed the mean of total viable bacterial count 15.62x107 cfu/gm . and table (2) the mean of canned fish 23.25x107 cfu/gm, it consider higher than accepted and it maybe due to processing practices, it can exacerbated contamination through poor hygienic(3)(4)(5).Also table (1) and (2) reveal that the mean of *E. coli* count 2.54x103cfu/gm and 6.75x103 cfu /gm in beef and fish respectively this result reveal to presence of unsanitary condition in the processing plants and there numbers considered to be a more practical indicator of the hygienic efficiency and microbiological status of the processing and product (12) (14)and (15)and the study show 22% of samples contain no E.coli count.Also this table showed that the staphylococcus count 288x105cfu /gm in canned beef and table (2) showed 16.15x105 cfu/gm in canned fish at range 0-60x105 and 2-36x105 cfu/gm in beef and fish respectively. This result consider higher than acceptable and there are many factor may influence the rate of Staph. aureus food poisoning include food which is not subsequently heat processed , in adequate time or temperature or both during heat processing of meat (15)(17) where table (3) showed that the 48.5% and 45% of samples positive for coagulase test.While table (1) showed the mean of Enterococcus count 22.027x105 cfu/gm and 11.22x104 cfu/gm for Psychrotrophic bacteria whear table (2) showed the mean 10.35x105 and 13.02x104 cfu/gm for Enterococcus and Psychrotrophic count in canned beef and fish respectively.And the maen count of Anaerobic bacteria in canned beef and fish 1.742x103 and 3.6x103 cfu /gm respectively , there are many importance Anaerobic bacteria and the condition necessary for the production of toxin which dangerous in certain conditions like an oxygen free environment and low acidity ,improperly canned low acid food ,such beef and fish can provide this environment (8).So the study showed the mean count of mould and yeast of canned beef and fish 2.82x104 and 5.25x104 cfu/gm respectively.(18) found that canned meat contain low number of mould than un canned meat. However,the processing environment and product handling and packaging may introduce microorganism, including pathogens, into packaged product that also must be considered. There is no an aerobic bacteria growth found in canned meat and fish samples.

Table (1). The canned beef samples results are expressed as colony forming unite per gm

N=35	Total plate count	E.Coli	Staph.aureus	Enterococcus	Psychrotrophic	Anaerobic Bacterial Count	Mold Yeast
Mean	$15.62x10^7$	$2.54x10^3$	$8.22x10^5$	$22.027x10^5$	$11.22x10^4$	$1.742x10^3$	$2.82x10^4$
S.d	$\pm 1.94x10^7$	$\pm 0.40x10^3$	$\pm 1.53x10^5$	$\pm 6.79x10^5$	$\pm 1.71x10^4$	$\pm 0.48x10^3$	$\pm 0.56x10^4$
Rang	$0\text{-}37x10^7$	$0\text{-}9x10^3$	$0\text{-}60x10^5$	$0\text{-}169x10^5$	$0\text{-}31x10^4$	$0— 6x10^3$	$0\text{-}15x10^4$

Table (2). The canned fish samples results are expressed as colony forming unite per gm

N=20	Total plate count	E.coli	Staph.aureus	Enterococcus	Psychrotrophic	Anaerobic Bacterial Count	Mold Yeast
Mean	$23.25x10^7$	$6.75x10^3$	$16.15x10^5$	$10.35x10^5$	$13.02x10^4$	$3.6x10^3$	$5.25x10^4$
S.d	$\pm 3.42x10^7$	$\pm 2.14x10^3$	$\pm 2.400x10^5$	$\pm 1.63x10^5$	$\pm 1.400x10^4$	$\pm 0.88x10^3$	$\pm 1.36x10^4$
Rang	$3\text{-}43x10^7$	$0\text{-}37x10^3$	$2\text{-}36x10^5$	$0\text{-}25x10^5$	$4\text{-}25x10^4$	$0\text{-}22x10^3$	$0\text{-}15x10^4$

Table (3).Coagulase test for *Staphylococcus aureus*

Samples	No. of staph.	No. strain positive for enzyme	%
Canned beef n=35	35	17	48.5
Canned fish n=20	20	9	45

References

1.Briggs, G.M.(1985).Muscle food and human health .food Technol.2:54-58.

2.Corry ,J.E. and Hinton ,M.H.(1997). Zoonosis in the meat industry . Acta .Vet .Hung .45:457-479.

3.Al.Tai, M.A.J.(1986).Fish and meat Technology. Dar Al.kutob for press . Basrah Univ.

4. Biss, M.E. and Hatha way , S.C.(1996).Effect of pre-slaughter washing of lambs on the microbiological and visible contamination of the carcasses Vet.Rec.138:82-6.

5.Galland ,J.C(1998).Risks and prevention of contamination of beef carcasses during the slaughter process in the united state of America. Rev. Sci. off.Int. Epiz. 16:395-404.

6.Freeman ,W.H.(1960).The science of meat and meat products. Amer . Inser – found .Reinhold pub. corporation ,New York.

7.Christie ,A.B.(1980) Infectious diseases epidemiology and clinical practice.3rd Ed., Churchill living stone, Edinburgh ,P.24-36 ,60-70.

8.Analysis of Microbial Hazards Related to Time /Temperature control of foods for safety .Center for Food Safety and Applied Nutrition .December .31.2001.

9.American Public Health Association .(1985). Standard methods for the examination of dairy product ,15th . American public Health Association .New-York.
10. Mahmood ,K.H, Mohamed, S.H. and AL-Kashaly, S.S. (1992). The microbial quality of raw ground beef from local markets in Basrah, Iraq. Basrah J.Agric. SCI. 5:7-14.
11. Sproer, W.H. and Tatini, S.R.(1975). Interpretation of the tube coagulase test for identification of *Staphylococcus aureus*. Appl: microbial .929:502-505.
12. Gill, C.O.; McGinnis, J.C. and Bryant, J.(1998) .Microbial contamination of meat during the skinning of beef carcass hind quarters at their slaughtering plants. Int. J. Food Microbial 42:175-184.
13. Quinn, P.J.; Carter, M.E.,Makey, B. and Carter, C.R. (1998). Clinical Veterinary Microbiology. 2nd ed. Mosby, London Philadelphia.
14. Gill, C.O., and McGinnis ,J.C. (1999). Assessment of the adequacy of cleaning of equipment used for breaking beef carcasses. Int. J. Food Microbial.46:1-8.
15. Gill, C.O; Badoni, M and McGinnis ,J.C. (2000). Contamination of beef trimming with *Escherichia coli* during a carcass breaking process .Food Res. Int.33:25-130.
16. WHO.(1976).Microbial Aspects of Food Hygiene.Technical Report Series No. 598. World Health Organization ,Geneva.
17. Bryan, F.L. (1978). Factors that contribute to outbreaks of food borne disease.J.Food Prot.41:816-827.
18. Tiwari, N.P. and Kadis ,V.W.(1981). Microbial quality of some delicatessen meat products .J. Food Prot., 44:821-827.

التقييم المايكروبي للحوم المعلبة

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الخلاصة

صممت الدراسة لتقيم ٥٥ عينة من اللحم المعلب (٣٥ نموذج من لحم البقر المعلب و٢٠ نموذج من السمك المعلب) جمعت العينات من الأسواق المحلية في محافظة البصرة جميع النماذج فحصت بواسطة العد الكلي للجراثيم الحية وعد العصيات القولونية وعد المكورات العنقودية الذهبية والمكورات المعوية والجراثيم المستديرة وعد الجراثيم اللاهوائية حيث بينت الدراسة أن معدل الجراثيم في اللحم البقري المعلب والسمك كانت ١٥.٦٢ ×١٠^٧ و ٢.٥٤×١٠^٣ و٨.٢٢ ×١٠^٥ و١.٢٢ ×١٠^٤ و١.٧٤٢ ×١٠^٣ و٢.٨٢ ×١٠^٤ و.ت.م/غم وكذلك ٢٣.٢٥×١٠^٧ و٦.٧٥ ×١٠^٣ و١٦.١٥ ×١٠^٥ ١٠.٣٥ ×١٠^٥ و١٣.٠٢×١٠^٤ و٣.٦ ×١٠^٣ و٥.٢٥ ×١٠^٤و.ت.م/غم على التوالي. وكذلك بينت الدراسة إن النسبة المئوية لإنتاج أنزيم التجلط من قبل جراثيم المكورات العنقودية الذهبية٤٨.٥% و ٤٥% لحم البقر المعلب والسمك على التوالي ولم يتم ملاحظة أي نمو للجراثيم اللاهوائية في المعلبات المفحوصة.