Assessment of the hygienic quality of some smoked meat produ in alexandria governorate

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Abstract

A total of one hundered 100 samples of smoked meat products were collected f different supermarkets and also from meat processing plant apply quality managen system at Alexandria province.he samples were hot dog and frankfurter. Th samples were examined bacteriologically for total colony, count, psychrotrotro count and detection of aerobic spore formers, detection also of salmonella staphyloccous aureus.We also test the samples chemically for determination of soc nitrite and measure pH.Results indicated that the bacteriological quality and chen analysis of samples collected from plant were within the legal limitWhile most sam collected from supermarkets were exceeded the acceptable limits of AF psychrotrotrophic. Count, aerobic spore formers, as well as sodium nitrite cor salmonella could not be detected in all samples.We could conclude that qu assurance program which improve the hygienic quality to produce safe and quality of hot dog and frankfurter were discussed to be employed.

Introduction

During the last decade, the demand of ready-to-eat meat products have increase Egyptian food markets. So, the production of such types food has also grown ra and varied.Hot dog and frankfurter as smoked cooked meat products are delic meat products which is tasty, easily digested, and of high quality animal protein as as has enough amounts of vitamins and mineralsHot dog and Frankfurter are de as cooked meat products, formulated raw meat, common salt, sodium chlo nitrite... etc.Filled case is then subjected to a long term of heat treatment with a va controls. e.g. chamber temperature, product temperature, relative hum controls.The quality of Hot dog & Frankfurter are influenced by the quality o ingredient, although the ingredient may constitute a small part of the total food, may add a substantial number of hazards.

In recent years there has been world-wide renewed interest in meat hyg Outbreaks of food-borne illness associated with bacterial agents are reported e year (Vander Linde et al., 1998). Many of these illness are due to growth of patho and/or toxin formation.

Millions of people worldwide suffer form some sort of food poisoning each Uncontrolled and abusive application of agricultural chemicals, environm contaminants, use of unauthorized additives, improper food quality control handling practices during food processing and other abuses of food along the chain can all contribute to the introduction of hazards or the failure to reduce haz related to food. (White head and field, 1995).

Technological development in meat processing and handling have given consum much greater choice over the food they can buy. So meat hygiene can comp nearly every aspect of processing from the health of the live animal to the distrib of the final product, it prevents harmful ingredients manufactured meat products the sale of contaminated meat Processed meat products may at time constitu

public health hazards due to presence of spoilage microorganisms responsible objectionable changes or pathogenic leading to infection and in toxication.
The quality of a product may be defined as its measurement against a stand regarded as excellent at a particular price which is satisfactory both to the produ and to the consumer. The aim of quality assurance is to ensure that a product confir as closely as possible and consistently to that standard at all times. Food saf became more and more actual due to changing of the population and increased fo infections. Eating habits moved more and more from hours cooking to convenien ready-to-eat products. This change in the market initiated new products and prod presentation towards more risky products on the food safety level. Quality syste were considered foundations for food safety systems and too many standards w introduced covering the same target.
The importance of the link between nutrition and health becomes more and more a topic. (Aggett et al., 2005). One third of all cancers are caused by in appropriate int and imbalance of food components.The aim of this work is directed to evaluate quality of Hot dog & Frankfurter in a plant that applying quality assurance program as as in a traditional plant.

Material and methods

A total of one hundred random samples were collected from different supermarl and also from meat processing plant apply quality management system at Alexan governorate and 75 swabs from workers, utensils and machines. (Calculate col cm^2) The collected samples were final product of Frankfurter and hotdog resembling samples of each.
The samples were transferred directly to the laboratory in an ice box under ase condition without any delay. Then the samples divided into two portions. The 1^s bacteriological examination and the other part for chemical examination.

I. Bacteriological examination of all samples

A. Determination of total aerobic plate count (APC) (APHA, 1992).
B. Total psychotropic bacterial count (ICMSF, 1978).
C. Isolation of aerobic spore formers (Gibson & Gordon, 1974).
D, Isolation and identification of Staphylococcus aureus (ICMSF, 1996).
E. Detection of Salmonella spp. (Vassilidis, 1983).

II. Chemical analysis of final product samples

A. Quantitative estimation of sodium nitrite ($NaNO_2$): (AOAC, 1975).
B. Determination of PH (Chambers et al., 1976).

Results:

Table (1): Results of bacteriological examination of final product samples of ho samples/ gram in meat processing plants compared with supermarkets.

Parameters	Aerobic plate count		Psychrotrophic bacte count	
	Supermarkets	Factory	Supermarkets	Facto
No. of examined samples	25	25	25	25
Minimum	4.4×10^5	1.9×10^3	5.06×10^5	3.06×
Maximum	5.8×10^5	3.6×10^4	6.3×10^5	5.06 $\times10^4$
Mean	$5.08\times10^5\pm0.08\times10^5$	$2.9\times10^4\pm0.11\times10^4$	$5.7\times10^5\pm0.1\times10^5$	3.9×1 0.1×1

SE= Standard error of mean.
** = supermarket and factory samples differ significantly ($P < 0.05$)

Results present in table (1) indicated that the mean value of APC in hot dog w 2.9×10^4 in examined final product samples of factory with range of 1.9 ×1 & 3.6×10^4 In Samples collected from supermarkets ranged from 4.4×10^5 5.8×10^5 which higher than samples collected from factory.
Also table (1) revealed that psychotrophic count in samples collected fr supermarkets higher than samples collected from factory.

Table (2):Results of bacteriological examination of final product samples of frankfurt samples/ gram in meat processing plant compared with supermarkets.

Parameters	Aerobic plate count		Psychrotrophic bacterial count	
	Supermarkets	Factory	Supermarkets	Factory
No. of examined samples	25	25	25	25
Minimum	3.3×10^5	1.8×10^3	4.1×10^5	3.1×10^3
Maximum	7.4×10^5	3.8×10^4	7.9×10^5	5.6×10^4
Mean	$5.3\times10^5\pm0.2\times10^5$	$2.7\times10^4\pm0.1\times10^4$	$6.0\times10^5\pm0.2\times10^5$	$4.1\times10^4\pm0.1\times10^4$

SE= Standard error of mean. ** = supermarket and factory samples differ significantly ($P < 0.05$)
Table (2) shows that APC of frankfurter samples are higher than samples collect from factory ,while from factory ranged from1.8×10^3 to3.8×10^4 , also table (discussed that pshycotropic count in samples collected from supermarket higher th samples collected from factory

Table (3):Results of chemical examination of final product samples of hotdog sampl in meat processing plants compared with supermarkets:

Criteria	Factory	Supermarkets	ES limit
pH - Range - Mean ± SE	 4.90 - 5.8 5.31 ± 0.05	 4.5 - 4.9 4.62 ± 0.03	
$Na\ No_2$: - Range - Mean ± SE	87 – 120 107.8 ± 1.98	 135 - 210 170 ± 5.06	125 ppm

Chemical criteria of final product samples in table (3) revealed that the range of sodiu nitrite of hot dog in plant were from 87 – 120 while PH ranged from4.90 - 5.8 in facto and135 – 210 to 4.5 - 4.9 in samples collected from supermarkets.
Table (4):Results of chemical examination of final product samples of frankfurt samples in meat processing plants compared with supermarket:

Criteria	Factory	Supermarkets	ES limit
pH - Range - Mean ± SE	 5.80-6.60 6.18 ± 0.25	 5.80-6.90 6.23 ± 0.03	
$Na\ No_2$: - Range	80 – 120	 120-200	125 ppm

The obtained results in table (4) revealed that the range of pH and sodium nitri content in factory of frankfurter ranged from 5.80-6.60 and from 80 – 120 ppm ,Whi in supermarkets were from 5.80 to 6.90and from 120 to 200ppm.

Table (5): Results of total colony count of workers, walls and machines /cm^2, in proc plants:

	Workers	Walls	Machines
Range	$1\times10 - 1\times10^2$	0 - 1×10	0 - 1×10
Mean ± SE	5.32×10 ± 0.918×10	4.8 ± 0.102×10	4 ± 0.1×10

Table (5) discuss aerobic plate count of swabs of workers walls & machines/ plant were$1\times10 - 1\times10^2$, 0 - 1×10, 0 - 1×10 respectively with mean values5.32 0.918×10, 4.8 ± 0.102×10, 4 ± 0.1×10

Discussion

Aerobic plate count is usually used to assess the overall sanitation and s conditions of meat products, so it included in all meat regulations for hygier quality grading.The obtained results of both products hotdog and frankfurter re that mean value of APC of examined samples Collected from supermarkets. e the legal limit, this may be due to poor hygienic storage or those subjected to fr fluctuations nearly similar results were reported by Ahmed (1991). While the sa collected from the plant which apply quality management system within the acce limit of E.S (1972/2005) requirementsPsychotropic bacterial count of both pr hotdog and frankfurter collected from supermarkets higher than those collecte the plant.

Nearly similar results were reported by (Carter et al., 1992) but lower than that re by Dennis et al., (1972).Aerobic spore formers found at an incidence 30 % & both hotdog & frankfurter respectively in the samples collected from supermarke be due to the method of processing, the pre-packing conditions, handling and v of such products Nearly similar results were recorded by (Khalifa, 199 recommended that suitable heat or irradiation treatment should be used complete destruction of the organisms is warranted .Storage under su refrigeration Temperature, Through cooking & rapid serving of meat prod necessary as spore forming bacteria can survive in spore form after norm treatment & then germinate & proliferate during storage meat products ,for whic contamination may be critical ,should therefore be made with spice extracts ins natural spices , In addition ,special attention should be given to s pore content & other additives.S.M.L EL Shishnagui and E.M.E.Abd El –Hafiez (20 presence of large numbers is indicative of active growth and proliferation organisms and is consistent with a potential health hazard specially whe products are sometimes eaten without post processing cooking.

Staphylococcus aureus was present at incidence (30%) in the examined s collected from supermarkets of both hotdog and frankfurter. These results attributed to the improper processing condition. On the other hand Staphylo aureus could not be detected in the samples collected from the plant, this may to good hygienic practices and high standard personal hygiene of applied assurance program.Also, our results showed that we failed to detect Salmone of all samples collected from both supermarkets and plant.

From chemical analysis of final product samples of both hot dog and frankfu show that pH values of samples in plant similar to (Manal, 2001) (Hala an 2002) and also (Amal, 2004). pH of muscle tissue associated with the water

capacity of the muscle protein, visual colour, appearance and storage life of th product, muscle acidity is important in regulating shrinkage during processing ar influence palatability. (Pearson, 1984).

While in supermarkets, pH higher than plant, may be attributed to kind of oil added the mixture of products (hotdog-frankfurter). Or method of storage

Meat with a pH below 5.8 will have less water capacity and a pale colour which mear significant cooking losses, while meat with higher pH it has the disadvantage of a gre risk of contamination and too dark colouring. (Bayne and Michener 1975). The ideal p level for the meat products is between 5.8 and 6.3. While 6.5 may be considered as a indicative for starting spoilage of meat. (Peasron, 1968). Low pH mixture of sodiu pyrophosphate, sodium tripoly phosphate, and sodium poly phosphate had a stabilizir effect upon pH during storage (Nelsen and Zeuthen, 1983).

Nitrite play a role in inhibition of most microorganisms but due to its carcinogenic effe nitrite percent considered as a critical control point if increased above accepted limi (Incze, 1995). The control of nitrite and salt in relation to the meat and verification of i residue on final product

Our results of sodium nitrite revealed that in plant (A) within legal permissible limit (12 ppm) from ES 1972/2005 (CCP critical control point). which declare controlling adding and mixing the salt(wafaa 2009). While in supermarkets most samples excee the legal permissible limit, which may be due to improper adding and mixing of sa Nitrites are added to meat to stabilize flavour, establish characteristic pink colour cooked meat (Daniells, 2006). Amount of nitrite necessary for complete formation nitric oxide myoglobine to stable pink colour was not more than 25 mg of nitrite / k (MC Dovgall, et al., 1975).

Hygiene could assessed through good manufacturing practices (GMP) which incluc temperature control, cleaning and disinfection, control systems.The compliance employees with good manufacture practice (GMP), cleaning and sanitation program were t main control points at this step, So, the hygienic measure of utensils and employees we examined. Recently food borne illness was increased from the consumption of meat and me products which were contaminated with human bacterial pathogens.Mishandling of food as well as uncleaned equipment surfaces were the most sources of contamination (Brya and Lyon, 1984).

Rules about washing hands before contacting foods, use of utensils to hanc products, disposable gloves, clean clothes, and protected hair need to be applie regardless of the size of the operation.Also hygienic working environment has positive influence on staff's morale. (Sprenger, 1993).Generally, major problem are in processing plants in clue waste disposal, plant environment, staff recruitment a training, provision of facilities, temperature, quality and hazard control. These affect t plant hygiene status and can thus represent hazard to public health.

CONCLUSION AND RECOMMENDATION

Application of quality assurance program during processing is important and impro the hygienic quality of product, but it is still not enough it needs reach to zero defe through application of HACCP system in plant vice versa in samples collected fr supermarkets.Using the concepts of ISO (International Organization Standardization), Codex Allimentarious and HACCP (Hazard Analysis Critical Cont Point).There are great relations between the basic food hygiene knowledge hygienic practice, delivery of effective food safety risk communication messages consumers. Prolonging the durability of the product through the reduction of

bacterial load which in-term protects the product from having a food poisoning b and protects the consumers from pathogens which may be present for improv sanitary status of meat products and safeguarding the consumers from re contaminated meat products can be achieved (Wafaa, 2009)Moreover, e control of food born diseases requires that the HACCP (Hazard Analysis and Control Point) system should be strongly applied to prevent health hazards, all o measures and more which strictly must be applied are included in ISO 22000 days. (Hashim, 2009).

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لملخص العربى

ييم الجودة الصحية لبعض منتجات اللحوم المدخنة فى محافظة الإسكندرية

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ت الدراسة على ١٠٠ عينة من منتجات اللحوم المدخنة المجمعة من السوبر ماركت المختلفة حافظة الإسكندرية وأيضا من مصنع لإنتاج اللحوم يطبق برنامج توكيد الجودة هذه العينات تشمل كل الهوت دوج والفرانكفورتر. وتم فحص هذه العينات بكتريولوجيا والعدد الكلى للبكتيريا الهوائية ضا العد الكلى للبكتيريا المحبة للبرودة، وعزل البكتيريا الهوائية المكونة للجرثومات وعزل يكروب العنقودى الذهبى وأيضا عزل ميكروب السالمونيلا وأيضا التحليل الكيميائى وتقدير قيمة س الهيدروجينى وقياس نسبة نيتريت الصوديوم;اكما تم تجميع عدد ٧٥ مسحة من كل العمال و كينات فى المصنع لتوضح الحالة الصحية للمصنع و نتجت أ نها جيدة وأوضحت النتائج أن ودة البكتريولوجية والكيميائية للعينات المجمعة من المصنع فى الحدود المسموح بها بينما معظم ينات التى جمعت من السوبر ماركت زادت عن الحدود المقبولة فى العد الكلى للبكتيريا الهوائية، عد الكلى للبكتيريا المحبة للبرودة والبكتيريا الهوائية الجرثومية. أوضحت الاختبارات الكيميائية أن صوديوم نيتريت فى السوبر ماركت أعلى من الحد المسموح به وكذلك أعلى من منتجات المصنع وقد حظ ارتفاع الأس الهيدروجينى عن ما هو فى المنتج الناتج من المصنع المطبق للجودة. بالإضافة إلى أن جميع العينات لم يستدل فيها على وجود ميكروب السالمونيلا. نستطيع أن نستخلص من هذه راسة أن تطبيق برنامج توكيد الجودة قد رفع الجودة الصحية لإنتاج منتج آمن وصحى وعالى الجودة كل من الهوت دوج والفرانكفورتر. هذا وقد نوقشت المعايير الموصى بها فى الاشتراطات الصحية ممارسات المتطلبة لتطبيقها.