Safety and Quality of Chicken Meat Products

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One hundred samples of ten poultry meat products were collected from AL-Ahsa markets (King Saudi Arabia). The samples were ranked from carcass cuts "filet and thigh" to minced meat or further processed products as burger, nuggets, frankfurter and meat paste loaf. Samples were collected in triplicate for sensory, chemical and microbiological analysis to assure their quality and safety.

The obtained results revealed variation in chemical composition; some products with high fat % have an increased thiobarbituic acid value, which results in their unacceptability due to the appearance of abnormal flavor.

Bacteriological analysis revealed that the mean total bacterial count was ranged form $2.7X10^4$/g for nuggets[1] to $3.3X10^7$/g for burger[2] and the other products in the range of 10^5 to 10^6 /gm, while *S. aureus* mean count ranged from less than 10^2/gm for all samples , accept 10^4/g and 10^6/g for mince[2] and frankfurter samples respectively . *E. Coli* isolated form 70% of the samples and *salmonella arizona* was isolated at once form thigh samples. Thirty % of samples not comply with Saudi Standards due to sensory unacceptability and 20% of samples nonconforming with bacteriological specifications.

Introduction

The first consumer right is to have a product of good quality and not constituting any health hazard. Poultry meat products are highly desirable, palatable, digestible and nutritious for all ages. In addition, they are low in price in comparison to beef and mutton.

Quality products are those that meet some need or expectation of consumers and are safe and wholesome as well. Further processing of poultry meat

involves conversion of raw poultry carcasses into value added products e.g. reconstructed products, cold cuts or breaded products. Advantages of further processing of poultry meat are improving juiciness and flavor, shelf life and water holding capacity (Sahoo, et al. 1996).

Poultry meat is comprised of about 20 to 23% protein, which comminuted products, such as frankfurters, bologna and sausages typically contain about 17 to 20% protein, 0 to 20% fat, and 60 to 80% water (Smith, 2001).

El-Khateib et al (1988) found that the total bacterial count of chicken products as sausage, burger, luncheon and frankfurter was 10^7, 10^7, 10^6 and 10^6 respectively, while *S. aureus* was isolated from the same products at incidence of 40%, 70% 20% and 40% respectively. While the mean pH values for the same products were 6.1, 6.3, 6.3 and 5.5 respectively, while the chemical analysis of the aforementioned products revealed a percentages of 59.4, 63.8, 66.9 and 61.2 for water, 18.2, 18.2, 19.9 and 17.8 for protein and 20.3, 15.3, 10.0 and 17.1 for fat respectively.

Unfortunately, such products offer ideal medium for microbial growth for they are highly nutritious, have a favorable pH, and are normally lightly salted or not salted at all (Johnston and Tompkin, 1992). Ready to eat meat or poultry products in which the level of *S. aureus* or *C. perfringens* has reached 10^6 / gm may cause illness. While the presence of salmonellae is considered a potentially hazardous (Tompkin , 1983).

Food safety aspects of poultry industry were discussed by Hunton (1997), in sections which consider: the growing awareness of food safety issues during the last 2 decades; the importance of food inspection services, risk assessment and management in increasing life expectancy among populations in developed countries. In addition to the potential dangers from food poisoning, as related to the shift in emphasis from carcass inspection to microbiological criteria and the increasing sensitivity of many quality tests; establishment of standards, etc., as affected by political considerations; the significance of quality of poultry meat

products to all involved in their production, handling and consumption ; and the role of communication and education in improving the situation.

Sockett (1995) estimated the socio-economic cost of salmonellosis in European countries. Results revealed that *Salmonella spp*. were the most commonly reported etiology of infection, although the relative importance of other agents varied. Factors contributing to the increase in food poisoning related to both foods eaten and their preparation. The implication of foods of animal origin as principle vehicles of infection was strengthened by reports associating these foods with outbreaks of human illness, and reports of Salmonella infections in animals and poultry. The increase in Salmonella infection associated with poultry products suggests that reducing infection in, or contamination of, poultry could significantly decrease human illness. Trends in the incidence of salmonellosis are linked to intrinsic factors (microbiological quality of the food and standards of preparation) and extrinsic factors (such as ambient temp., which amplify the intrinsic effects).

Minimizing the risks of food poisoning due to salmonellae, *campylobacter* spp. and similar pathogens in poultry products were discussed by many authors (Humphrey, 1991; and Mulder, 1995; Aulik & Maurer, 1999), through the prevention and control of contamination of chicken carcasses through optimal rearing, transport and slaughter conditions. The use of carcass decontamination techniques should only be considered as supplementary to measures taken in the production chain.

Processed raw poultry meat naturally harbors bacteria. Most of there bacteria are responsible for the spoilage of poultry meat. However, poultry products can harbor food borne pathogens, from which salmonella stereotypes, *C. jejuni* , *L. monocytogens* , *C. perfringens* and S. *aureus* (Waldroup,1996). Poultry and poultry products ranks first or second in foods associated with disease in most of the countries all over the world which in the USA ranked third of the reported food-borne disease outbreaks (Bean and Griffin, 1990).

In KSA the incidence of food poisoning due to food of animal origin were 76.80% in comparison to 23,20% due to food of plant origin. Poultry ranks first as cause in food poisoning with incidence of 29.32%, followed by meat and cream with an incidence of 15.33 and 8.78 respectively. In Eastern region of the kingdom suck incidence record a total of 96.27% for food of animal origin and 37,77% for poultry and their products. The food poisoning microorganisms causing outbreaks were mainly Salmonellae and *S. aureus* with an incidence of 8.99 and 11.54 respectively, while others were 4.07(Altabari and Al-Daghim, 2002).

The present work aimed to examine the market chicken meat products, for its quality and safety for human consumption through assessment for bacteriological quality with special reference to food poisoning microorganisms. In addition, the sensory parameters and chemical composition will be analyzed to assure quality in the aspects of consumer acceptability, degree of freshness and nutritive value.

Material and Methods

Ten samples (n=10) from each of selected poultry meat product (table 1) were collected in triplicate at random from AL-AHSA markets (one sample for bacteriological examination and the other two for sensory and chemical analysis). Collected samples were transferred in its package to the laboratory in an icebox immediately.

Sensory evaluation

The sensory evaluation was carried out on the poultry meat products using trained panelists, where the products were prepared according to the method recommended by the manufacturer and AMSA (1995).

Chemical analysis

All samples were examined for chemical composition to be estimating their compatibility with the national standards. The pH, total volatile base (TVB) and thiobarbituric acid (TBA) values were estimated as an indictor of the degree of products freshness. Samples will be analyzed in accordance to the methods of AOAC (1984).

Bacteriological examination

All the samples were Bacteriologically examined in accordance to APHA (1992).

Statistical analysis

Data were subjected to statistical analysis according to the procedure reported by Snedecor and Cochron (1980).

Results and Discussion

KSA market in the last decades had an intensive expand in poultry meat production, which developed in response to consumer demand. Consumers are interested in quality, which are those that meet their needs or expectations and are safe and wholesome.

In the present work, poultry meat products were examined for the most important quality parameters. The products were selected in accordance to their popularity, and because every producing company has its own formula for each poultry product; therefore for most of examined products, two companies were selected for each product to compare the differences in their composition and quality.

Sensory and chemical analysis

Table (1) reflects the results of sensory evaluation of the examined poultry meat product, which are most popular in the market. The samples were ranked form carcass cuts “Filet and thigh “ to minced meat or further processed products as burger, nuggets, frankfurter and meat paste loaf "Samposa”. The processed products subjected to reformulation of the poultry meat by addition of different additives, which virtually had a great influence on the quality of the final product (Keeton, 2001 and Sams, 2001).

Table 1 Sensory evaluation of poultry meat products

Products	Appearance	Odor	Taste	Consistency	Acceptability
Filet	4.86^{a}	5.47^{a}	5.88^{a}	5.50^{a}	5.04^{a}
Thigh	5.12^{a}	5.62^{a}	5.56^{a}	5.65^{a}	5.84^{a}
Mince ^{1}	4.30^{a}	4.46^{a}	4.83^{a}	3.02^{b}	4.36^{a}
Mince ^{2}	5.25^{a}	3.15^{b}	3.87^{b}	5.65^{a}	3.22^{b}
Burger ^{1}	5.43^{a}	5.96^{a}	5.85^{a}	5.75^{a}	5.75^{a}
Burger ^{2}	4.86^{a}	3.25^{b}	2.35^{c}	4.26^{a}	3.35^{b}
Nuggets ^{1}	5.86^{a}	5.80^{a}	5.60^{a}	5.83^{a}	5.75^{a}
Nuggets ^{2}	5.25^{a}	2.45^{c}	2.25^{c}	5.36^{a}	2.85^{c}
Meat paste loaf	5.14^{a}	5.05^{a}	5.28^{a}	5.22^{a}	5.42^{a}
Frankfurter	5.53^{a}	4.75^{a}	5.25^{a}	5.85^{a}	5.15^{a}

$^{a-c}$ Means within columns having different superscripts are significantly different ($p < 0.05$)
$^{1\ \&\ 2}$ indicating different manufacturers

The further processed poultry products as minced meat, burger, Nuggets, loaf and frankfurter, have a great variation in chemical composition (table 2), this is due to the reformulation of such products by the manufacturers to get the most benefit in the market. In such products having a high fat content it was noticed that there is on increase in the TBA value with a detectable unacceptable flavor and lower degrees of acceptability in such products as mince^{2}, burger^{2} and nuggets^{2}, this resulted form fat oxidation due to prolonged storage or due to the use of low quality meat in the processing of such defective products (Froning et al 1971 and Mulla , 2002)

Flavor is a complex sensation. It involves odor and taste (Brenda et al 2001). Mince ^{2}, burger ^{2} and nuggets ^{2} were significantly had lower flavor scores,

where the panelists were recognized a flavor of beginning of rancidity to rancid flavor. These products have high fat percentage and TBA values (table 2). Development of off–flavors known as rancidity is due to lipid oxidation (Owens 2001), which could be determined by sensory evaluation and measuring the degradation products as TBA(Cheng and Ockerman 1998; Mulla 2002). Many researchers reported a significant increase of TBA values due to prolongation of storage time (cheng and Ockerman, 1998 and sun et al, 2001).

Consistency in poultry meat products influenced by several factors as age (Lawrie 1979) forming of meat products from ground and comminuted meat with various ingredients (Lyon et al, 1980). Some other factors are more significant, such factors as genetics, physiology, nutrition, management, and disease, in addition to those occur before slaughtering dealing with fasting, transport, handling. All aforementioned factors have direct influence on pH of muscles, which virtually affecting the meat tenderness (shrimpton 1960, Kotula and Wang, 1994) Mince[1] had a lower grade of consistency (3.02 from 7) it may be due to the use of low quality meat or improper management and processing of the product.

Table 2 Chemical analyses of poultry meat products

Products	Moisture%	Protein%	Fat %	Ash %	pH	TVB*	TBA**
Filet	73.43^{a}	20.32^{a}	4.72^{a}	0.90^{a}	5.84	15.6	0.56^{a}
Thigh	71.62^{a}	20.01^{a}	6.41^{a}	1.05^{a}	6.63	14.3	0.48^{a}
Mince [1]	72.17^{a}	18.86^{a}	5.77^{a}	0.99^{a}	5.95	12.8	0.42^{a}
Mince [2]	69.22^{a}	17.01^{a}	11.71^{b}	1.97^{b}	6.37	14.1	3.01^{b}
Burger [1]	66.01^{b}	16.82^{b}	8.26^{c}	2.05^{b}	6.20	11.5	0.44^{a}
Burger [2]	68.60^{a}	15.07^{b}	11.13^{b}	2.10^{b}	6.20	10.8	2.86^{c}
Nuggets [1]	69.99^{a}	14.62^{c}	6.40^{a}	1.90^{b}	5.87	15.4	0.53^{a}
Nuggets [2]	61.65^{b}	12.58^{c}	6.67^{a}	2.02^{b}	6.03	13.5	2.09^{c}
Meat paste loaf	57.56^{c}	14.99^{c}	6.46^{a}	2.42^{b}	5.70	75.6	0.55^{a}
Frankfurter	70.27^{a}	14.82^{c}	8.77^{c}	2.97^{c}	6.13	10.6	0.62^{a}

$^{a-c}$ Means within columns having different superscripts are significantly different ($P < 0.05$)

[1 & 2] indicating different manufacturers

* Total volatile bases estimated as mg N / 100 gm sample

** Thiobarbituric acid estimates as mg malonaldehyde / kg sample

Table (2) showed the chemical compositions of the examined products, the filet and thigh constitutes the main material used for further processing of poultry products. Mead (2000) stated that there are two main kinds of poultry muscles, white (breast) and red (leg). There have structural and physiological differences, as well as different pH value (5.6 – 5.8 for breast muscle and 6.1-6-4 for leg muscle).

The chemical analysis (table 2) reflects the status of the poultry products in the market. The raw products " filet and thigh" have about 20% protein and from 4.72 to 6.41 fat. Smith (2001) stated that poultry meat is comprised of about 20-23% protein , while the fat content of leg meat is higher than that of breast and the moisture content of breast muscle is higher than that of leg . The mean pH value for breast and leg muscle was 5.84 and 6.63 respectively. Mead (2000) stated that breast muscle has a pH value in the range of 5.6 – 5.8, and leg muscle pH is 6.1 – 6.4 , and added that both types of muscle are relatively susceptible to microbial spoilage when stored in the unfrozen state .

Bacterial analysis

According to the Saudi Arabia standards for microbial levels of foodstuffs (SAS, No 1556, 1998), the required microbial level in poultry meat varies according to the type of product. In chicken filet, the total counts of bacteria should not exceed 10^6/g, *S. aureus* and *E. coli* counts are less than 10^2/g and Salmonella should be negative. Thus, the product was complying with the SAS. On other hand the total bacterial counts in chicken thighs was 5.1 x 10^6/g ; *S . aureus* and *E. coli* were isolated in counts lers than 10^2/g . *Salmonella arizona* was also isolated and thus makes the product not fitting with the SAS due to presence of *Salmonella* species.

In case of minced chicken meat [1]and [2] , the mean total bacterial count was 4.5x10^6/g comply with the SAS . *S. aureus* counts were 10^4 and 10^2 /g for minced meat[1&2] respectively . *E. coli* were detected in 70 % of sampels and no

salmonella was isolated . It is worth mentioning that the SAS did not specify the total bacterial and *S. aureus* counts allowed in frozen minced meat and other frozen products as compared to chilled meat where the total bacterial counts allowed was stated as $5.0x10^2$ /g and should not exceed 10^3 /g.

Table 3 Bacterial counts and isolated microorganisms from poultry meat products

Products	Bacterial counts		Isolated microorganisms %	
	Mesophiles	*S. aureus*	*E. coli*	Salmonellae
Filet	6.2×10^{6a}	$< 10^{2a}$	70	-
Thigh	5.1×10^{6a}	$< 10^{2a}$	60	10*
Mince [1]	4.5×10^{6a}	$< 10^{2a}$	70	-
Mince [2]	5.2×10^{5a}	10^{4b}	70	-
Burger [1]	1.6×10^{5a}	$< 10^{2a}$	60	-
Burger [2]	3.3×10^{7a}	$< 10^{2a}$	-	-
Nuggets [1]	2.7×10^{4b}	$< 10^{2a}$	60	-
Nuggets [2]	3×10^{6a}	$< 10^{2a}$	-	-
Meat paste loaf	2.5×10^{6a}	$< 10^{2a}$	-	-
Frankfurter	1.2×10^{6a}	10^{6c}	60	-

[a-c] Means within columns having different superscripts are significantly different ($P < 0.05$)

* *S . arizona* [1&2] indicating different manufacturers

It is well known that minced meat is an ideal medium for growth of various types of microorganisms. It is reported that other microflora present in meat have an adverse effect on the growth of staphylococci and that staphylococci grow better in cooked meat and in fresh meat treated with salt. The letter kills or suppresses the growth of saprophytic microflora normally present in meat. (Altabari 1984)

Concerning the chicken Burger[1]and[2] , the total bacterial counts conform to the SAS. The latter did not determine the limits for total bacterial count in frozen chicken Burger, which reached 1.6×10^5 and 3.3×10^7 /g in frozen Burger[1] and[2] respectively. *S. aureus* could be detected only in mince[2] and frankfurter[2] at mean counts of 10^4 /gm and 10^6 /gm respectively, while the other samples (80%) have a mean values less than 10^2 /g. and *E. coli* were isolated from 60% of samples ; SAS allows up to 10^3 /g for each bacterial type . Altabari (1984) stated that food poisoning with *S. aureus* enterotoxin can

occur when minced meat , already contaminated by large number of the bacteria during processing , are preserved at temperatures higher than 14^{o}C. To avoid this attention should be given to the initial bacterial contamination and meat should be kept at temperatures lower than 9^{o}C. It is common practice to keep minced meat at room temperature in hours and this predisposes for poisoning with *S. aureus* .

The total bacterial load of Nuggets [1] and [2] was conforming to SAS, reaching 2.7x10^{4} and 3.0x10^{6} /g respectively. *S aureus* counts were less than 10^{2} /g and *E. coli* was isolated from Nuggets[2] in incidence of 60%, while *salmonella* was failed detection.

In case of chicken loaf the total bacterial count reached 3.0x10^{6} / g and that of *S. aureus* was less than 10^{2}/g; the level specified for the latter in SAS is 10^{3}/g and no *salmonella* or E. *coli* were isolated.

In Frankfurter, the mean total bacterial and S.aureus counts were 1.2 x 10^{6}/g and 10^{6}/g respectively, while *E. coli* was isolated in the incidence of 60%. This product does not comply with the SAS as the level allowed for *S. aureus* is 10^{3}/g and salmonella should not be present , El-khateib(1988) recorded atotal bacterial count of 10^{6}/g for the same product and 10^{7}/g for burger.

It is clear from the aforementioned data that the total number of bacteria ranged from 2.7 x 10^{4} / g in Nuggets to 3.3 x 10^{7} /g in Burger [2]. According to the SAS the total microbial number allowed in frozen and chilled chicken meat and its products should not exceed 10^{6} /g and should not contain salmonella or *E. coli* 0157, though no particular salmonella species is specified. In this respect, *Salmonella arizona* was isolated at once only from chicken thighs.

S. aureus count in all samples investigated was less than 10^{2}/g except in minced meat and Frankfurter, where the count was 10^{4} and 10^{6} /g respectively. These high counts may indicate bacterial contamination during packing and handling.

Conclusively the study revealed that the poultry meat products not conforming to the SAS in 30% and 20% of cases due to sensory and bacterial causes.

Acknowledgment

The financial support of the Deanship of Scientific Research, King Faisal University, under project number 3003, is gratefully acknowledged.

REFERENCES

Altabari G.(1984)

Enterotoxigenic characteristics of strains of *Staphylococcus aureus* isolated from food sources, influence of specific factors on survival and growth. Doctoral dissertation, Faculty of Vet . Med. Sarajevo University.

Altabari G. and Al-Dughaym A.M. (2000)

The role of sanitary inspection of meat in relation of food poisoning . The second Annual Scientific Meeting for environment hygiene (meat hygiene) , Riyadh , 180 – 203 .

American Meat Science Association " AMSA" (1995)

Research Guidelines in Cookery, Sensory Evaluation and Instrumental Tenderness Measurements of Fresh Beef . American Meat Science Association, Chicago, IL .

Association of Official Analysis Chemists " AOAC" (1984)

Methods of Analysis 12th Ed. Assoc. of . Anal. Chem. Washington, DC.

Aulik , J.H & Mourer , A. J. (1995)

Lactic acid bacteria in poultry products . Poultry and Avian Biology Reviews, 6, 3, 1415 – 1418.

Bean,N.N.and Griffin,P.M.(1990)

Foodborne disease outbreaks in the United States, 1973-1987; pathogens, vehicles and trends, J.Food Prot.,53,804 .

Cheng, J. H. and H. W. Ockerman. (1998)

Warmed – over Flavor and Palatability Characteristics in Roast Beef . Meat Sci. V. 49,1, 65 – 78.

EL-khateib , T.; Abd El-Rahman , H; Hamdy , M . and Lotfi , A (1988) Poultry meat products in Egypt " Proximal chemical composition and microbiological quality" Fleischwirtsch. 68, 6, 756- 757.

Froning , G. W., Arnold , R. G., Mandigo , R. W., Neth , C.E., and Hartung , T. E. (1971)

Quality and storage stability of frankfurters containing 15% mechanically deboned turkey meat , J. Food Technol., 36, 974.

Humphrey T.J. (1991)

Towards safer poultry meat .

Poultry internat . 30 , 4 , 38 – 40

Hunton , P. (1997)

Food safety : everybody's business .

Misset world poult . 13. 7. 13 – 15

Johnston , R . W. and Tompkin , R. B. (1992)

Meat and poultry products.

" In compendium of methods for the microbiological examination of foods" P. 821 – 835 publ . American public Health Assoc. " APHA"

Keeton,J.T.(2001)

Formed and emulsion products. In poultry meat processing .

Edd. Sams ,A. R. , CRC , Press

Kotula , K. L. and Wang , Y.(1994)

Characterization of broiler meat quality factors as influenced by feed withdrawal time , J. Appl. Poult. Res., 3, 103.

Lawrie , R. A. (1979)

Meat science 3rd ed . , Pergamon press , oxford .

Mead , G. C . (2000)

Fresh and further – processed poultry . In : The Microbiological safety and quality of food . Ed. Lund , B. M. , Aspen Pub., 445-471.

Mulder , R. W. (1995)

Decontamination of broiler carcasses .

Misset World Poultry, 11, 3, 39 – 40

Mulla, Z. S. (2002)

Studies on the onset of warmed over flavor in ground beef products and the use of M – S based electronic nose in differentiating beef products. Thesis, the Ohio state University.

Owens , C. M. (2001)

Coated poultry products . In poultry meat processing. Ed. Sams, A. R. CRC ,Press.

Sahoo , J ; Samoon , A . H . and Sapcota , D. (1996)

Recent developments in further processed poultry meat products.

Indian Food Indust. , 15 , 2 , 30 – 36

SAS (Saudi Arabian Standard) (1998)

Saudi Arabia standards for microbial levels of foodstuffs , No 1556.

Shrimpton , D. H. (1960)

Some causes of toughness in broilers (young roasting chickens) . I.Packing stations procedure, its influence on the chemical changes associated with rigor mortis and on the tenderness of the flesh,

Br. Poult. Sci. 1, 101.

Smith , D. M. (2001)

Functional properties of muscle proteins in processes poultry products .

In poultry meat processing . Edd. Sams ,A. R. , CRC , Press.

Snedecor, G.M. and Cochron, W.C. (1980):

Statistical Methods. Oxford and J.B.H. Publishing Comp. 6th Ed.

Sockett , P. N. (1995)
The epidemiology and costs of diseases of public health significance, inrelation to meat and meat products.
J. Food Safety ; 15 , 2 , 91 – 112

Sun ,Q., Faustman, C., Senecal A., Wilkinson , A. L., and Furr,H.(2001)
Aldehyde reactivity with 2- thiobarbituric and TBARS in freeze – dried beef during accelerated storage . Meat science , 57; 55 – 60.

Todd, E.C.(1978)
Foodborne disease in six countries-a comparison .J. Food Prot., 41,559.

Todd, E.C.(1980)
Poultry associated Foodborne disease- its occurrence, cost, sources and prevention. J. Food Prot. , 43,129.

Tompkin , R. B. (1983)
Indicator organisms in meat and poultry products.
Food Technol . 37 , 6 , 107 .

Waldroup, A.L (1996)
Contamination of raw poultry with pathogen .
World's Poult.Sci., 52,7.

سلامة وجودة منتجات الدجاج

عبدالله بن محمد الدغيم ، غسان الطبري ، منير حمدي
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للوقوف على مدى سلامة وجودة منتجات لحوم الدجاج . تم جمع مائة عينة من عشرة أنواع مختلفة من تلك المنتجات من أسواق الأحساء . وقد تراوحت تلك المنتجات من ا زأت (صدور فيليه وأفخاذ) إلى المصناعات مثل مفروم الدجاج ، البرجر ، قطع الدجاج (ناجت) ، الفرانكفورتر وسمبوسة الدجاج ، وقد تم جمع عينات لشركتين مختلفتين في كل من المفروم ، البرجر والناجت دف المقارنة . وقد كان سحب العينات بأسلوب ثلاثي وذلك للفحص الحسى والكيميائي والبكتيري .

وقد أثبتت النتائج تواجد اختلافات في التركيب الكيميائي للمنتجات . وقد لوحظ أنة في بعض المنتجات التي ترتفع فيها نسبة الدهون صاحب ذلك أرتفاع في قيمة حمض الثيوباربيتيوريك مما أنعكس على الخصائص الحسية لتلك المنتجات برفضها لظهور علامات التزنخ في الرائحة والطعم .

أثبتت التحاليل البكتريولوجية أن متوسط العدد الكلي للبكتريا يتروح بين ٢,٧×١٠^{٤}/جم لقطع الدجاج إلى ٣,٣×١٠^{٧}/ جم في البرجر^{٢} . بينما كان عدد أستافيلوككس أوريوس يتراوح بين أفل من ١٠^{٢}/جم لمعظم العينات ، فيما عدا المفروم^{٢} والفرنكفورتر فقد كان ١٠^{٤}/جم و ١٠^{٦}/جم على التوالي . وقد تم عزل ميكروب الاشيريشيا كولى من ٧٠% من العينات وعزل ميكروب سالمونيلا أريزونا في حالة واحدة فقط من عينات أرجل الدجاج . وفي الخلاصة فأن منتجات لحوم الدجاج لم تتوافق مع المواصفات السعودية من حيث الصفات الحسية والبكتريولوجية في ٣٠% و ٢٠% على التوالي .