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CHEMICAL AND BACTERIOLOGICAL EVALUATION OF CAMEL MEAT IN KAFR EL-SHEIKH CITY

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ABSTRACT

A total of thirty samples of camel meat were collected from butcher's shops from Kafr El-Sheikh city and examined for bacteriological and chemical evaluation the mean of APC, coliforms (MPN) and S. aureus count were 9.4 x 10^5, 2.55 x 10^5 and 4.8 x 10^4, cfu/g respectively. All samples were free from salmonella. The mean percentage of chemical component of protein %, fat %, ash % and moisture% were 18.09. 22.91, 1.39 and 72. The examined samples had a normal values of Cd. Pb and Hg (the mean values were 0.005, 0.0014 and 0.009 ppm). respectively.

INTRODUCTION

Traditional physical meat inspection in markets is based on visual inspection which does not identify pathogenic microorganisms such as salmonella Enteropathogenic *E. coli* or *Staph. aureus.* ***Edwards et al. (1997)***. To improve the control of such pathogens must be apply the hazard analysis critical control point(HACP)system which has promoted and implicated in the European Union (EU). During processing of meat may become contaminated with both spoilage and pathogenic microorganisms form fecal and stomach contents. Addition sources of microbial contamination are the processing tool equipments structural components of the facility human contact and carcass to carcass contact ***(Institute of Food Technologists 2002).***

In Egypt camel meat makes up an important part of the dietary proteins especially for the lower income population ***(Shalash, 1979)***.

In producing good quality meat, it is important to keep microorganisms at low level for reasons of aesthetics, public health and product shelf life. All foods should be expected to contain a certain number of microorganisms (except sterile flood) of one type or anther. Ideally the numbers of organisms should be as low as possible under good conditions of production. Excessively high number of microorganisms in fresh meat present cause for alarm ***(Tay, 1992).***

The muscle tissues of healthy living animals are usually free from microorganisms and their contamination during slaughtering is undesirable but can't not be avoided as the transformation of live animals into meat contamination was mostly occurred by means of animals exterior surface. The gastrointestinal tract and the introduction of pathogens into the meat surface during slaughtering, handling. Cutting processing and storage. ***Sierrra et al., 1995 and Edward and Dainty (1987)*** state that the ammonia is one TBV-N produced by microorganisms in portentous food such as meat.

Verma et al., 2008 state that moisture content of buffalo heart meat (28.42%) and head meat (76.94%) was significantly ($P < 0.05$) higher than buffalo skeletal meat (75.85%) buffalo heart meat had significantly lower protein content (15.49%) than head meat (19.25%) and skeletal meat (19.84). Fat and ash content of buffalo skeletal meat head meat and heart meat did not differ significantly among themselves. Ph of buffalo head meat (6.41%) was significantly higher than skeletal meat (5.85%) and heart meat (5.80).

The toxic elements. cadmium, lead and mercury are widely distributed in environment and generally regarded as accidental pollutants although they are frequently found in minute amount in food ***(Lucis et al., 1972 and Underwopod, 1977)***.

The present study was planned to evaluate the camel meat present in Kafr El-Sheikh market from the quality via including some bacterial indices determination of chemical contaminants, evaluation of some nutritive values which are important to health of consumer.

MATERIALS AND METHODS

Collection of samples:

Thirty samples of camel meat were collected from butcher's shop from Kafr El-Sheikh city in polyethylene bags which were placed in ice box and transported to the laboratory without delay for the following examination.

I. Bacteriological examination:

1. Aerobic plate count ***(FAO 1992)***: The recommended method was carried out using standard plate count agar incubated at 37°C for 24 h.
2. *Staphylococcus aurues* ***(FAO 1992)*** using surface spread plate method on Baird Parker agar. The coagulase positive strain was further identified biochemically.
3. Enumeration of coliform bacteria by most probable number (MPN) according to ***FAO (1992)***.
4. Isolation and identification of salmonellae according to Health Protection Agency ***(HPA) (2003a)***.

II. Chemical examination:

1. Determination of protein %

It was carried out according to ***AOAC (1990)*** using kjeldahl apparatus.

2. Determination of fat %

It was carried out according **to** ***AOAC (1990)*** using Soxhlet apparatus for extraction of fat.

3. Determination of Ash %

It was carried out according to ***AOAC (1990)*** using muffle furnace at 500% for 3-4 h.

4. Determination of moisture %

It was carried out according to ***Konieko (1985)*** using hot air oven at 105°C for 3 h.

5. Detection of some heavy metals

The detection of mercury lead and cadmium were carried out according to ***AOAC (1990)*** using wet acid digestion method and atomic absorption spectrophotometer.

Table (1): Statistical analytical results of bacterial count (cfu/g) of examined camel meat samples.

Type of microorganisms	No. of examined samples	Positive samples		Count/g		
		No.	%	Min.	Max.	Mean ± SE
Total aerobic bacterial count	30	30	100%	1×10^3	1×10^7	$9.4 \times 10^5 \pm 4.32 \times 10^5$
Coliform count (MPN)	30	26	86.67	0.004×10^3	2×10^6	$2.55 \times 10^5 \pm 1.14 \times 10^5$
Staph. aureus count	30	30	100%	3×10^3	1.7×10^5	$4.8 \times 10^4 \pm 8.63 \times 10^3$

Min = Minimum Max = Maximum SE = Standard error of mean

Table (2): Incidence of salmonella in examined camel meat samples no = 30.

Meat samples	Suspected +ve samples		Presumptive salmonella isolates by biochemical		Confirmed salmonella strain by serology
	No	%	No	%	
Raw camel meat	9	30	3	12.5	-ve

Table (3): Some main nutritive values of camel meat.

	Protein %	Fat %	Ash %	Moisture %
Minimum	16.8	21%	1.3	71
Maximum	17.5	22.6	1.45	73
Mean	17.09	21.91	1.39	72
SE	0.089	1.65	0.006	0.1

Table (4): Concentration of some heavy metals in examined samples.

	Cadmium	Lead	Mercury
Minimum	0	0.007	0.005
Maximum	0.04	0.03	0.099
Mean	0.005	0.014	0.009
SE	0.004	0.001	0.004

DISCUSSION

From Table (1) it was proved that 30 samples of camel meat had aerobic plate count (TAPC) minimum and maximum APC were 10^3 and 10^7 with mean value of 9.4×10^5, respectively with percentage of 100%, for coliform count Most probable number minimum and maximum were 40.2×10^6 with mean value of 2.55×10^5 with percentage of 86.67% and for *Staph. aureus* count minimum and maximum were 3×10^3, 1.7×10^5 with mean value of 4.8×10^4 with a percentage of 100%.

Salmonella serotype not identification from all samples nearly similar results were recorded by ***Roushdy et al. (1983), Youssef et al. (1985).***

ICMSF (1980) stated that contamination received by meat during cutting deboning and packaging depend on the local condition.

The meat receives extensive handling during these operations and fresh surface are exposed this makes the meat more susceptible to the effects of contamination Factors such as temperature of the deboning room, the time is held there and the clean lines of cutting tables. Conveyor belts saws, knives and other equipments all affect the microbial flora.

In Table (3) the minimum a maximum value and mean value of protein % fat%, ash % and moisture % were 17.5%, 18.8%, 18.09% $\pm$ 0.089-21%, 22.6%, 21.91% $\pm$ 1.65%-1.3%, 145%, 13.9 $\pm$ 0.006-71%, 73%, 72% $\pm$ 0.1, respectively nearly similar results obtained by ***Verma et al. (2008).***

In Table (4) the data presented showed that the examined samples had a normal values of cadmium, lead and mercury when compared by ***FAO/WHO (1972)*** dietary intake limits (Cd 20-100 µg/day, Pb 100 µg/day and Hg 0.03 mg/day. Egyptian organization for standardization and quality control E.O.S.Q.C.(2360-1993)mentioned that the maximum provisional weekly intake from -cadmium by human as 0.0067-0.0083 mg/kg body weight and 2 mg/kg of sample weight and from lead by human as 005 mg/kg body weight.

Cadmium (Cd) concentration of camel meat ranged from 0 to 0.04 with mean values of 0.005 $\pm$ 0.004 these results agreed with those reported by ***Folandyez and Lorenc Biala (1991) and Salisburay et al. (1991).***

Lead concentration ranged from 0.007 to 003 with mean values of 0.014 ± 0.001. These results with agreed the results which reported by ***Spaulding (1975)*** and ***Salisbury et al. (1991).***

Mercury (Hg) conc. in camel meat ranged from 0.005 to 0.099 with mean values of 0.009 ± 0.004 the recorded results agreed with those reported by ***Sell et al. (1975).***

In conclusion. camel meat samples showed high bacterial loads beside a relatively high rate of the pathogens, this is due to miss-handling and processing as well as the negligible of hygienic aspects at the production level. Therefore, one can safely recommend the following, aiming to have meat with good quality: good hygiene of the meat handlers during the processing stage as well as good of sterilization of utensils and working surface. Thermostable of refrigerators and deep freezer is important for retarding the growth of both pathogenic and spoilage bacteria. Each food item must be kept separate. The laboratories performing the analysis must be accredited according to the ISO standard. Food handlers need to be educated on the importance of proper, safe hygienic working practices.

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التقييم الكيمانى والبكترولوجى للحوم الجملى فى مدينة كفرالشيخ

جمال باز محمد ، جمال الدين ابراهيم مزيد

معمل بيطرى كفر الشيخ

تـم تجمـيع عدد ثلاثون عينة من لحوم الجمال المذبوحة فى مدينة كفر الشيخ حيث خضعت للفحـوص البكتـرولوجية والكيمائـية وكـان متوسـط العـدد الكلى البكتيرى للميكروبات الهوائية والميكـروبات القولونية (العدد الاحتمالى) والميكروب العنقودى الذهبى هو 9.4×10^5 ، 2.55×10^5 ، 4.8×10^4 علـى الترتيب كما لم يتم عزل اى نوع من السالمونيلا من جميع العينات وكان متوسط نسبة البروتين والدهون والرماد والرطوبة كالاتى: 18.9% ، 21.91% ، 1.39% ، 72% علـى التـرتيب وكان متوسط قيم المعادن الثقيلة (الكادميوم والرصاص والزئبق) كالاتى: 0.005 ، 0.014 ، 0.009 وهى فى الحدود المسموح بها.