J. Food and Dairy Sci., Mansoura Univ., Vol. 5 (6): 339 - 351, 2014

THE PRODUCTION AND EVALUATION OF HEALTHY PRODUCTS FROM CAMEL MEAT

Abd EL - Halim, A. A.
Meat and Fish Technol. Res. Dept., Food Technol. Res.Institute, Agric. Res. Center, Giza, Egypt.

ABSTARCT

Camel is animal rarely get sick and it is relatively cheap meat with many benefits as a meat product of low relatively fat content and is highly nutritious and has potential to be used to combat, hyperacidity, hypertension pneumonia and respiratory disease, but people do not accept its meat because of their high content of connective tissues fibers and roughness meat. Papayas and doum fruits are excellent source of polyphenols, sugars and fibers, enzymes and have many health benefits. The papayas and doum full fruits that are widely consumed in Egypt, addition of fresh camel meat was processed as burger batties to improve the organoleptic properties soften camel meat. Papayas and doum in that burger batties at level of, (5% and 10% doum full powder (T1 and T2)), (5% and 10% papayas flesh juice (T3 and T4)), (2.5% doum full powder + 2.5% papayas flesh juice (T5)) and (5% doum full powder + 5% papayas flesh juice (T6)), in comparison to two control groups were conducted. The control groups were fed on either a basal diet (negative control) or high fat diet containing 15% animal fat (positive control), treatments were added to diets of adult male albino rats for 60 days. Proximat analyses and sensory evaluation of burger samples and testing the significance between the samples were investigated. Serum bio-chemically analysis for total cholesterol (TC), triglycerides (TG), HDL-cholesterol, total protein, uric acid, createnine, alanine and aspartate amino trans ferase (ALT and AST) and glucose were determined. all treatments recorded high scores in overall acceptability especially, T4 and T6.The biological evaluation of the full doum and papaya additives had significant effect on the serum lipid profile. Treatment 6 posses the greatest reduction in total cholesterol, triglycerides, and total lipids. Treatment 4 showed high reduction GPT, GOT, total protein, uric acid, createnine and glucose. Generally, the mixture of doum and papaya with camel meat have improved the sensory and acceptability of the camel meat products in addition to the biological effect especially the liver and kidney functions.

INTRODUCTION

As a consequence of an increase demand for therapeutic drugs from natural, there is now a greater interest in the antioxidants. The antioxidants act as defensive systems which is present in varying degrees in the intracellular and extracellular spaces (Chow, 1997). There is no cure for cirrhosis at this time. However, physicians attempt to delay its progress, minimize liver cell damage, and reduce the complications of the disease through the use of druge and dietary and lifestyle recommendations (Gaudio, *et al*; 1993).The antioxidant activity depends on the individual structure and the hydroxyl groups of the flavonoid (Richelle, *et al;* 2001).Lipid oxidation is one of the major changes that can occur during processing, distribution, storage and final preparation of foods. The oxidation could be prevented by adding synthetic or natural antoxidants. This situation promotes increasing demand for food additives of natural origin (Mancimi- Filho*, et al;* 1998). Many

naturally occurring compound found in edible and medicinal plants , herbs and species have neon shown to possess antimicrobial functions and could serve as a source of antimicrobial agents adinist food pathogens (Deans and Ritchie . 1987).Phenolic compounds and their subclasses , such as cumin's, flavonoids , tannins , sapiens and essential oil have antimicrobial function (Kubo, *et al.,* (1993).

Recently it has become increasingly clear that chemicals found in our foods and beverages can prevent the genetic damage that leads to cancer initiation, glabraene(a compound isolated from glycyrrhizin glabra) has antimutalnic potential against cancer (shankel, *et al.,* 2000). Excessive intake of fatty acids leads, to an accumulation of triglycerides in many tissues. The increased circulation of fatty acids associated with rising lipolysis in adipocytes with insulin resistance, results in a plethora of fatty acids to non-adipose tissues such as muscle, pancreas and liver (Park, *et al*., 2005). Both epidemiological and in vitro studies suggest that catechins have effects on human health, serving to protect against CHD and cancer due to their ant oxidative activity and demonstrated that administration of EC enhanced the level of ant oxidative activity in rat plasma. A shortage of antioxidants in the diet might promote coronary heart disease through accumulation of oxidized LDL in macrophage (Yamanaka, *et al.,* 1997). Antioxidant may also influence on endothelial function smooth muscle cell proliferation, thrombosis and plaque ruptures. Beverages are inversely correlated with heart disease rates and rich in natural antioxidant nutrients, including acrobats, vitamin E and carotenoids (Glugliano, 2000).The aim of this study is to investigate the effect of added papayas juice and doum fruit powder on some biological and biochemical parameters in hyper lipid emic rates. Also to study its utilization as sugars, fiber, vitamin E, B creation, polyphenols in production of health products from camel meat.

MATERIALS AND METHODS

A: - Materials

Camel meat fresh were obtained from the butchers at the local market in QaluoblyaGovrmonate, and used in processing of burger was manufactured by the common method applied in the local market, wherein, the camel meat washed in tap water several times. Camel meat burger was prepared by the common method either control or treatments according to the formulations present in Table (2), control and treatments were evaluated immediately after processing for sensory and chemical properties.

Preparation of papayas fleshes (juice) and full doum powder.

Papayas:

1-Wished in papayas in tab water.

2-Removal of outside layers (peels) then (discarded) and the tissues inside (flesh) cut to small pieces and mixed in blender until obtain juice and keep freezed until used.

Full doum powder:

1-Full doum powder was dried at 70ºC in air dryer oven (roste) for 10-15min.

2-The dried doum was ground using a moulinex grinder to obtain the flour and kept cold until used.

Animals and diets:-

Adult's male sprgue-Dwley albino rats (average weight 160,00g) were obtained from the Biology Unit in Food Tech. Res. Ins. All rats fed on basal diet for 7 days (adaptation period) consisting of protein 20%, cellulose 5%, cotton seed oil 15%, salt mixture 4%, vitamin mixture 1% and corn starch 55% according to (Lenepeter and Pearson, 1971). After that the rats were divided into eight groups (5 rats/each) fed on the prepared diets as shown in Table (3). Biological evaluation of the different diets was carried out by estimated body weight gain according to (Chapman, *et **al;*** **(1959).** Blood samples were collected before and after treatments from orbital venous plexuses into a centrifuge tube and the serum was separated and stored at -18ºC till analysis.

Preparationof diets:

Diets were the prepared diets as following:

A-control (basal diets) negative group

B- Control (basal diet containing 15%animal fat) positive control.

C-Basal diet containing 15%animal fat (burger camel meat with additives full doumpoweder 5%) (T1)

D-Basal diet containing 15% animal fat (burger camel meat with additives full doum powder (10%) (T2).

E- Basal diet containing 15% animal fat (burger camel meat with additives 5% papayas juice (T3).

F- Basal diet containing 15% animal fat (burger camel meat with additives 10% papayas juice (T4).

G- Basal diet containing 15% animal fat (burger camel meat with additives papayas juice 2.5% + full doum powder 2.5%) (T5).

H- Basal diet containing 15% animal fat burger camel meat with additives (papayas juice 5% + full doum powder 5%)(T6).

Chemical analysis:

Crude protein, fat, ash and moisture content were determined following the method described by (AOAC, 1995).Thiobarbituric acid value (TBA) was determined as mentioned by pearson (1970). Phenolic compound fractions were determined by HPLC methods according toGoupy*, et al; (1*999)

Microbiological methods:

Nutrient agar media incubated at 37ºC for 24-48 hrs was used for determination of total aerobic plate count (TPC) (Difco, 1970).

Sensory Evaluation:

Burger camel meat of different treatments were evaluated for their compactness, after processing. Burger was evaluated for color, odor, texture, taste and overall acceptability according to the method described by (Allam, 1977).

Biochemical analysis:

Biological evaluation of the different diets was carried out by estimation of body weight gain according to (Chapman*, et al;* 1959). At the end of the 8-weeks experimental period, all rats were fasted overnight and anesthetized

with diethyl ether to be sacrificed. Blood samples was collected from the portal vein into a dry centrifuge tube and the serum obtained was analyzed to determine total cholesterol according to the method of Richmond (1973).Triglycerides were determined according to the method of (Fassati and Prencipe, 1982). High density lipoprotein cholesterol (HDL-C) was determined according to (Gordon, 1977). Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST) were measured calorimetrically at wave length (505nm), according to method of, Reitman and Frankel (1957).Uric acid was determined by enzymatic colorimetric method at wavelength of 510nm according to the method described by Berham and Trinder (1972).Creatinine was determined by colorimetric kinetic method at wavelength of 340nm according to the method described by Bartles, *et al.,* (1972). Total lipid were determined according to (Zollner and Kirsch, 1962).Glucose was determined according to (Trinder, 1969).Total protein, was determined by kits according to method (Watanabe, *et al;* 1986)

Statistical analysis:

The method used for the statistical analysis of the results was according to Kurtz, (1983).

RESULTS AND DISCUSSION

Chemical composition and microbiological:

Data in Table (4) show the % moisture, protein, fat and ash, percentage as well as thiobarbituric acid (T.B.A,as mg malonaldehyde/Kg sample) and total aerobicplate count(T.P.C.)(cfu/g) of fresh camel meat and treatments. It could be observed that there are changes of protein, fat, TBA, T.P.C between all samples either control or treatments. Anyway, in compression with fresh camel meat, due to the different treatments, it could be observed that %moisture, TBA, and T.P.C were decreased while, % fat was increased, because decreased of moisture and added of animal fat in preparation of treatments. But, the protein decrease of treatmentsT2, T3, T4 and T6 and increase in T5 and T1. This clearly indicated the effect of different treatments used to full doum powder and papayas flesh juice compared with fresh camel meat burger(control).The results indicated that, treated samples with doum and papayas due to reduce TBA and TPC ,this may be due to the effect of added as additives (full doum powder and papaya extract) were rich in polyphenols these play a major role as natural antioxidant which prevent formation of free radical which are responsible for many oxidative processes and essential oil have antimicrobial function(Kubo,*et al*; 1993).

Sensory evaluation:

Data in Table (5) show the sensory evaluation of burger camel meat (control) and treatments. The results indicated that treated samples with doum and papayas in proved color and taste compared with control, especially in higher replacement levels. Papayas and doum offer not only the luscious taste and sunlit color of the tropics, but, also carotenes, vitamin C, flavonoids and the minerals, as potassium, magnesium and fiber. In addition, there were slight significant difference between treatments with doum,

papayas and the control, these replacement obtained high scores in the overall acceptability; due to the brown color of the crust in burger samples with doum and papayas especially in higher replacement levels. Also, unfamiliar taste of the doum and papayas for some panelists and high fiber content in samples those have got high evaluations scores in general appearance and overall acceptability, compared to the control sample.

Biological studies:

1- Body weight gain and relative liver weight:

Data in Table (6) show the body weight gain and relative liver weight of rats fed on high fat diets with and without natural additives. It could be observed that, by the end of feeding period 8 weeks, the results indicated that group of rats fed on high fat diets (positive control), had a higher significant (un healthier increase) in body weight gain compared to negative control which were fed normal diets, this also, the results show the rats fed on high fat diets (positive control) caused significant increase in liver weight, but treated diets with doum and papayas caused no-significant increase compared with negative control. Consequently increasing of body weight, and liver in rats fed on high fat diets (positive control) as well as, increment of lipid in blood might be result hypertension and cardiovascular diseases. In addition enhance change in lipid profile and liver functions of rats fed on treatments, this effect may be due to its content of antioxidants, polyphenol compounds, minerals, sugars and other some components and also to dietary fiber in full doum powder and papayas.

2- Lipid profile:

Data in Tables (7 and 8) show the effect of full doum powder and papaya extract on lipids profile, as (TL), (TC) (TG) and (HDL-C) of rats fed on high fat diets for 8 weeks. The feeding rats on high fat diet without natural additives (papaya extract and full doum) (positive control) caused highly significant increase in total cholesterol (TC), triglycerides (TG) and total lipids (40.94%, 42.92% and 40.10%) respectively compared to negative control. But, treated diet of natural additives caused significant decrease among all treatments either for total cholesterol 18.61-35.63%, triglycerides 25.90 - 34.17% and total lipids 16.96-24.14% compared to positive control respectively. T6 and T2 caused significant increase in HDL/total cholesterol ratio. The highest decrease in cholesterol and triglycerides 35.63% -34.17% occurred in T6, while the highest decrease in total lipids was found in treatments T2 and T5 (24.14 and 23.58%) respectively. The hypolipedemic properties of doum may be partly due to presence of polyphenols which may be form complexes with cholesterol and bile in the intestine there by indirectly reduce the cholesterol level in the blood. Also, the reduction in triglycerides may be due to the increase in activity of the endothelium bound lipoprotein lipase which hydrolyses the triglycerides into fatty acid. Doum and papayas are another factor that affects reduction of lipids profile in the blood, this due to its contents of polyphenol compounds as reported by Table (1).

Aspartate amino transferase(AST); alanine amino transferase(ALT) and glucose:

Data in table (9) show the aspartate amino transferase(AST);alanine amino transferase(ALT) and glucose in serum of rats fed on high fat diet without natural additive and high fat diet treated with natural additive(full doum powder and papaya extract).It could be noticed that at zero time, there were no significant differences between all groups concerning AST,ALT and glucose.Feeding of rats on high fat diet without additives caused highest significant increase in AST, ALT and glucose 60.70% -16.50% and 45.59% compared with negative control and treatments. While, feeding of rats on high fat diet treated with natural additives had significant decrease of AST, ALT and glucose contents in serum of rats compared with positive control. The highest decrease in AST, ALT and glucose were recorded for group (T4) 34.60%, 19.91% and 33.95% respectively, compared with positive control.This may be due to papaya extract contents of phenols compounds as (gallic acid, coumarin, vanillic acid, caffeine, catechein, catechol and syringic acid 1.87, 5.54, 26.78, 2.45, 45.47, 2.14 and 8.89 mg/100g sample respectively, which may be prevent of free radical formation, increase of vascular smooth muscle and improve the liver function as shown in table(1) .

3-Total protein, uric acid and creatinine:

Results in table (10) show the total protein, uric acid and creatinine in serum of rats feeding on high fat diet (positive control) and treated diet with additive (full doum and papaya extract). It could be noticed that, there were no significant differences between all groups concerning total protein, uric acid and creatinine at initial of experiment. At the end of experiment there non-significant increase in total protein for group (T1, T4 and T5), while (T2, T3 and T6) showed non-significant decrease compared with negative control. But, all treatments caused significant decrease in total protein and uric acid compared to positive control. All treatments improved these functions, whereas the total protein, uric acid and createnine, especially T6 caused high significant decrease in total protein, uric acid and createnine, percent decrease were 17.81 – 12.80 and 23.53% compared with positive control. This may be due to doum fiber and yellow color in papayas flesh source of B –carotene and vitamin C, as improver to biochemical changes both antioxidants, significantly inhibited lipid peroxidation as well as kidney and liver cell damage B-carotene on its own exerts a strong antioxidant effect, it is able to quench singlet oxygen and interrupt the generation of reactive oxygen species at very early stage(Nagel,*et al* .,1997).Throughout its antioxidant effect B-carotene help in protecting the body from the irritating effect of smoke and other pollutants and may be helpful in preventing problems like ulcers, atherosclerosis and its complications, and liver injury(Sokol and Hoffenberg,1996) and protecting the membranes against damage by free radicals through its chain breaking antioxidatant action that serves to stop the propagation step in lipid peroxidation(Matsumoto*,et al*.,1996). The nutrients in papaya have also been shown to be helpful in the prevention of colon cancer. Papaya's fiber is able to bind to cancer-causing toxins in the colon and keep them away from the healthy colon cells. This due to Papaya’s folate, vitamin C, beta-carotene, and vitamin E have each been associated with a reduced risk of colon cancer

Table (1): Chemical composition and phenols fractions of doum and papayas

Chemical composition g/100g	Doum		Papayas		Phenol fractions mg/100g	Doum	Papayas
	WW	DW	WW	DW			
%Moisture	10.45	-	85.87	-	Gallic acid	2.76	1.87
%Protein	2.86	3.19	0.65	4.60	Coumarin	1.14	5.54
%Oil	1.43	1.60	0.43	3.04	Vanillic acid	10.72	26.78
%Ash	7.64	8.53	0.35	2.48	Caffeine	3.85	2.45
%Fiber	18.34	20.48	3.57	25.27	Catechein	36.12	45.47
%Carbohydrate*	59.28	66.20	9.13	64.61	Catechol	2.81	2.14
-	-	-	-	-	Syringic acid	2.87	8.89
-	-	-	-	-	Caffeic acid	1.43	-

WW : wet weight D.W: dry weight * by difference

Table (2) Recipe used in preparation of camel meat burger patties (control and treatments).

Control		Treatments					
		T1	T2	T3	T4	T5	T6
Fresh camel meat	65	65	60	65	65	65	65
Soy protein	10	5	5	5	5	5	5
Animal fat from tail sheep	15	15	15	15	15	15	15
Ice water	5	5	5	5	-	5	-
Nacl+species	3	3	3	3	3	3	3
Red onion	1	1	1	1	1	1	1
Red garlic	1	1	1	1	1	1	1
Full doum powder	_	5	10	_	_	2.5	5
Papaya extract	_	_	_	5	10	2.5	5

Table(3):Composition of the tested diets(g/100g).

Diets / Groups	Protein		%Fat			%Minerals	%Cellulose	%Vitamins mix	%Starch
	Casein	Sample wt(g)	Cotton seed oil added%	%Fat in sample	%Animal fat from tail sheep				
A-Control(-)	20	_	15	_	_	4	5	1	55
B-Control(+)	20	_	_	_	15	4	5	1	55
C-T1	_	81.30	_	12.02	2.98	4	5	1	55
D-T2	_	86.92	_	11.15	3.85	4	5	1	55
E-T3	_	80.94	_	11.34	3.66	4	5	1	55
F-T4	_	90.37	_	11.77	3.23	4	5	1	55
G-T5	_	80.00	_	11.15	3.85	4	5	1	55
H-T6	_	85.43	_	11.12	3.88	4	5	1	55

Table (4) chemical&microbial quality of fresh camel meat and treatments (on wet weight).

Item / Treatments	%Moisture (w.w)	%Protein (w.w)	%Fat (w.w)	%Ash(w.w)	T.B.A mg/kg sample	T.P.C cfu/g
Fresh camel meat	65.20	24.10	7.90	2.73	0.2498	$8.7X10^6$
Control	59.39	24.08	14.30	1.90	0.2210	$8.5X10^5$
T1	58.19	24.60	14.79	2.19	0.2230	$7.6X10^5$
T2	58.11	23.01	13.94	3.56	0.1841	$7.6X10^5$
T3	59.33	24.71	14.01	1.86	0.2165	$8.4X10^5$
T4	59.74	22.13	14.20	2.90	0.2075	$2.7X10^5$
T5	58.81	25.01	14.01	2.06	0.2074	$9.3X10^4$
T6	59.30	23.41	14.13	2.93	0.1621	$7.4X10^4$

Control: Burger without added full doum powder and papaya extract.
T1: Burger with added 5% full doum powder.
T2: Burger with added 10% full doum powder.
T3: Burger with added 5% papaya extract.
T4: Burger with added 10%papaya extract.
T5: Burger with added 2.5% full doum powder+2.5% papaya extract.
T6: Burger with added 5.0% full doum powder+5.0% papaya extract.

Table(5): Sensory evaluation of burger camel meat and treatments

Characters treatments	Color(10)	Taste(20)	Texture(10)	Odor(10)	Overall acceptability(10)
Control	7.50b	16.00c	6.40c	7.70bc	7.52b
T1	8.25ab	17.0abc	6.95abc	7.50bc	7.94b
T2	8.00ab	17.80ab	7.35ab	6.95c	8.02b
T3	8.35ab	17.0abc	6.95abc	7.80bc	8.03ab
T4	7.50b	16.7bc	6.80bc	7.65bc	7.73b
T5	7.50b	17.3abc	6.90bc	8.65ab	8.07ab
T6	8.50a	18.0a	7.80a	9.50a	8.76a
L.S.D	0.93	1.71	0.85	1.14	0.74

Table (6) Body weight of rats fed on camel meat burger and treatments.

Parameters	Initial body weight	Final body weight	Difference	% increase in body weight	Liver weight	Relative weight of liver %
Control(-)	160.41d	212.71c	52.30d	32.60b	5.39c	3.36c
Control(+)	160.72d	243.79a	83.07a	51.69a	8.61a	5.36a
T1	160.63d	216.21b	55.58cd	34.60b	6.31b	3.93bc
T2	160.59d	225.71b	65.12bc	40.55b	6.61b	4.11b
T3	161.21d	220.41b	59.20bcd	36.72b	6.81b	4.22b
T4	160.41d	228.91b	68.50bc	42.71b	7.67ab	4.78ab
T5	160.49d	228.40bc	67.91bc	42.31b	6.89b	4.29b
T6	160.95d	225.62b	64.67bc	40.18b	7.24b	4.50ab
LSD	14.54		12.22	9.71	1.10	0.95

Table (7): Total cholesterol and triglycerides in serum of rats fed on camel meat burger:

Groups	Total cholesterol(mg/dl)		Triglycerides(mg/dl)	
	Initial	Final	Initial	Final
Control(-)	57.54d	62.41cd	87.25b	87.86b
Control(+)	55.72d	87.96a	86.68b	125.57a
T1	58.52d	63.78bcd	87.64b	91.25b
T2	52.41d	60.47bcd	86.55b	90.34b
T3	54.69d	67.11bc	88.14b	87.49b
T4	57.46d	69.54bc	86.33b	88.79b
T5	56.75d	71.59b	87.59b	93.05b
T6	53.25d	56.62d	84.88b	82.66c
L.S.D	7.95		5.71	

Table (8): Total lipid, HDL and HDL/Cholesterol (ratio) in serum of rats fed on burger from camel meat

Treatments	AST(U/L)		ALT(U/L)		Glucose(mg/dl)	
	Initial	Final	Initial	Final	Initial	Final
Control(-)	41.45cd	40.68d	37.48c	38.79bc	84.54cd	95.11c
Control(+)	40.75cd	65.41a	38.22c	45.19a	87.31cd	138.47a
T1	41.36d	44.21cd	38.67bc	37.17c	90.45cd	105.41bc
T2	42.14cd	47.29bc	37.86c	39.87bc	90.67cd	100.25c
T3	42.51cd	50.14b	39.14bc	40.19b	87.64cd	96.76c
T4	42.31cd	42.78c	37.16c	36.19c	89.45cd	91.45c
T5	43.11cd	46.31bc	38.47c	39.64bc	87.63cd	115.46b
T6	43.21cd	44.62cd	38.13c	41.76b	90.46cd	110.58cb
L.S.D	5.12		3.14		14.88	

Table (9): AST, ALT and glucose in serum of rats fed on camel meat burger.

Groups	Total lipid(mg/dl)		HDL(mg/dl)		HDL/cholesterol(ratio)	
	Initial	Final	Initial	Final	Initial	Final
Control(-)	265.21d	267.55d	30.14cd	33.15c	52.38de	53.12d
Control(+)	264.77d	374.84a	28.15d	39.54b	50.52de	44.95e
T1	265.19d	311.25b	28.68d	41.52ab	49.01de	65.10bc
T2	267.22d	284.34c	27.67d	44.32ab	54.72de	73.30ab
T3	266.34d	301.64bc	27.69d	43.52ab	50.89de	64.85b
T4	266.44d	294.31c	28.45d	45.61a	49.51de	65.60bc
T5	266.75d	286.47c	29.45d	40.67b	51.90de	56.80cd
T6	265.85d	309.27bc	27.65d	43.87ab	51.92de	77.50a
L.S.D	15.70		4.94		10.66	

Table (10): Total protein, uric acid and create nine in serum of rats fed on camel meat burger and treatments.

Groups	Total protein(mg/dl)		Uric acid(mg/dl)		Create nine(mg/dl)	
	Initial	Final	Initial	Final	Initial	Final
Control(-)	6.80cd	7.21bc	1.75bc	1.74b	0.45bc	0.43cd
Control(+)	6.47d	8.31a	1.82bc	2.11a	0.48ab	0.34ef
T1	6.54d	7.47b	1.78bc	1.91b	0.47ab	0.27g
T2	6.49d	6.89cd	1.79bc	1.95b	0.48ab	0.32f
T3	6.47d	6.87cd	1.71c	2.21a	0.49a	0.40d
T4	6.44d	7.48b	1.72c	2.08a	0.50a	0.36e
T5	6.56d	7.57b	1.79bc	1.84b	0.48ab	0.40d
T6	6.39d	6.83cd	1.85bc	1.87b	0.49a	0.26g
L.S.D	0.46		0.22		0.04	

REFERENCES

A.O.A.C. (1995): Official methods of analysis association of official analytical chemists,Arlington Virginia 22202,USA.

Allam,A.A.G.(1977):Chemical and technological studies on production of salted fish steaks.M.SC.Thesis Agric.Coll.,AL-Azhar University.

Bartles,H;Bohmer,M. and Heirli,C.(1972):Colorimetric kinetic method of creatinine.Clin. Chem.Acta, 37:193.

Berham,D. and Trinder,P.(1972):Enzymatic colorimetric method of uric acid.Analyst,97:142.

Chapman,D.G.; Gastilla,R. and Campbell,J.A.(1959):Evaluation of protein in food.I.A. Method for the determination of protein efficiency ratio.Can. J. Biochem. Physiol, 37,679-686.

Chow,C.K.(1997):Vitamin E and oxidative stress free radical.Biol. Med.11:215.

Deans, S.C. and Ritchie, G.A. (1987): Antimicrobial properties of essential oil. Int. J. Food Microbiol., 5:165-180.

Difco,M.(1970):Difco manual of dehydrated culture media and reagents for microbiological clinical laboratory procedures.Detroit,Michigan,USA.

Fassati,P. and Prencipe,I.(1982):Colorimetric method for determination of triglycerides.Clin. Chem.,28:2077.

Gaudio, E.; Pannarale, L.; Franchitto, A. and Riggio, A.(1993):Zinc supplementation in experimental liver cirrhosis:a morphological, structural and ultra- structural study.Int.J.Exp.Path.,74:463-9

Glugliano,D.(2000):Dietary antioxidants for cardiovascular prevention.Nut. Metabolism and cardiovascular-Diseases, 10(1):38-44.

Gordon,T.M.(1977):HDL-Cholesterol(determination after separation of high density lipoprotein lipid).Amer.J.Med.,62:707.

Goupy, P.; Hugues, M.;Boivin,P. and Amiot,M.J.(1999):Antioxidant composition and activity of bariey(Hordeumvulgare) and malt extracts and of isolated phenolic compounds.J. Sci. Food Agric., 79:1625.

Kubo, I.,Muroi, H. and Himejima, M.(1993): Antibacterial activity against streptococcus mutans of mate flavor components . J.Agric. Food Chem. , 41:107-111.

Kurtz,N.R.(1983):Introduction to social statistic 3rd Ed., md Grow-hill Book company, New York 163.

Lanpeter,W. and Pearson,A.E.G.(1971):Dietary requirements in the laboratory animal principles and practice.Acad. Press, London and New York, P.142.

Mancimi - Filho, J.; Van koliy, A.;Manani,D. A.; Cozzolino,F. E. and Torres,R. P. (1998): Antioxidant activity of cinnamon(cinnamoumZeylanicum, Beryne) extracts.Boll-Chim-Farm, 137(11):443-7.

Matsumoto,S.; Matsue,M. and Niki,E.(1996): Oxidation of vitamin E model compound 2.2, 5, 7, 8 –Pentamethyl chroman-6- oC with the tert- butyl-peroxyl radical. J.Chem. Soc. Commun. , 5:1067.

Nagel,E.; Vilsendorf,A.M. and Bartels,M.(1997):Antioxidativevitamins.Internal. J.Vit. Nutr. Res.67:298-306.

Park,S.H.; Ko, S.K. and Change,S.H.(2005):Euonymus alatus prevents the hyperglycemia and hyperlipidemia induced by high- fat diet in ICR mice.Journal of Ethnopharmacology,102,326-335.

Pearson,D.(1970):The chemical Analysis of Food. National College of Food Technol., Univ. of Reading,Wegbridge,Surry,J.andChirchill,A.

Reitman,A. and Frankel,S.(1957):Colorimetric determination method of GOT(AST),GTP(ALT).Amer. J.Clin.Path,8:56.

Richelle,M.; Tavazzi,I and Offord,E.(2001):Comparison of the antioxidant activity of commonly consumed polyphenolic beverages(coffee, coca and tea) prepared per cup serving.J. Agric Food Chem., 49:34-38.

Richmond,N.(1973):Enzymatic colorimetric method for determination of cholesterol.Clin. Chem., 19:1350-1356.

Shankel, D.M;Pillal,S.P.,Telikepalli,H.,Menon , S.R ., Pillai , C.A. and mitscher,L.A.(2000):Role of antimutagens/ anticarcinogens in cancer prevention .Bio.factors.12:1-4,113-121:19.

Sokol,R.J. and Hoffenberg,E.J.(1996):Antioxidants in pediatric gastrointestinal disease. Ped.Clin.N. Am. 43(2):471.

Trinder,P.(1969):Enzymatic determination of glucose in blood serum. Ann.Clin. Biochem, 6:24.

Watanabe, N.; Kamel, S.;Ohkubo,A.;Yamanaka,M.;Ohsawo,S.; Makino,K. and Ojuda,K.(1986):Enzymatic determination of protein in blood serum.Clin Chem.,3218:1551.

Yamanake, N.;Oda,O. and Nagao,S.(1997):Green tea catechins such as(-)-epicateclun and(-)-epigallocatechin accelerate CU2+ induced low density lipoprotein oxidation in propagation phase. FEBS Letters 401,230.

Zollner,N. and Kirsch,K.(1962):Colorimetric method for determination of total lipid,2.Ges. Exp. Med., 135: 545.

انتاج وتقييم منتجات صحية من اللحم الجملي

علي احمد عبد الحليم

قسم اللحوم والاسماك-معهد بحوث تكنولجيا الاغذية مركز البحوث الزراعية- الجيزة

ثمار الدوم و الباباظ من الثمار الغنية بالاليـاف و السكريات و الفيتامينات بالاضافة الى البوليفينولات،فهى تعمل علىحمايةالجسمم من الامراض و لذلك يعتبر مشروب الدوم و الباباظ من المشروبات واسعة الانتشار و المحببة فى مصر و العديد من دول العالم الاخرى . و حيث ان من المشاكل الرئيسية فى اللحوم و منتجاتها قابليتها العالية للتزنخ و الفساد و احتوائها على نسبة عالية من الكوليسترول،لذلك تم استخدام مسحوق الدوم ولحم الباباظ (عصير) فى منتجات لحوم البرجر المصنعة من اللحم الجملى كمواد مانعة للتزنخ و الفساد بالاضافة انها تعمل على حماية الجسم من الامراض لدلك فقد اجريت هده الدراسة لمعرفة تاثير اضافة الدوم و الباباظ كمواد خافضة للكوليسترول و الجلسسريدات الثلاثية و الليبيدات الكلية و انزيمات الكبد و الجلوكوز فى الدم حيث تم اضافة البرجر المصنع من اللحم الجملى المحتوى على ١٥% دهن حيوانى و المدعم بنسبة٥%- ١٠% مسحوق دوم و ٥%- ١٠% عصير باباظ و ٢.٥%مسحوق دوم +٢.٥%عصير باباظ ، ٥%مسحوق دوم +٥% عصير باباظ للبرجر المصنع من اللحم الجملى و تم اضافة البرجر المصنع بهده النسب الى غذاء الفئران و التغذية عليه لمدة شهرين و قد اوضحت النتائج المتحصل عليها ان جميع المعاملات التى تم اضافة مسحوق الدوم و عصير الباباظ اليها كانت مقبولة من الناحية الحسية كذلك فان التقيم البيولوجى اوضح ان المجموعة السادسة و الرابعة اعطت نتائج جيدة حيث ادت الى خفض للكوليسترولوالجلسريدات الثلاثيةوالليبيدات الكليةوانزيماتالكبدوالجلوكوز و لذلك ربما من الممكن استخدام هده النسب فى منتجات اللحوم .