Vet. Med. J., Giza. Vol. 45, No. 3. (1997):345-352.

QUALITY ASSURANCE OF A NEW LOCALLY PRODUCED MEAT PRODUCT " BEEF".

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SUMMARY

Twenty random samples of "Beef" were examined for organoleptic, chemical and bacteriological characters. The mean values of pH, moisture, protein, fat, rancidity, nitrites and Nacl were 6.14,60.25, 18.43, 21.04, 0.066, 74.95 and 2.38 respectively. Whereas the mean values of APC, enterobacteriacae count count and Staph aureus count were $7.8x10^6$, $1.2x10^4$ and $2.8x10^3$ respectively. No salmodellae nor Y.enterocolitica were isolated. Evaluation of the product was done during storage time.

INTRODUCTION

The consumption of ground meat and its products has been increased in Egypt due to the lack of sufficient time to prepare food, in addition, it is extended with soy protein which makes its price economically attractive to consumers. Factories of meat products tend to produce new products different from the popular products. Some factories now produce a new product from ground meat simila in taste and component to corned beef but it is not canned and packed in poly ethylene package . It is composed of frozen minced meat, carbohydrates, spices and sodium nitrities. It is stored chilled and vaild for 5 days.

The idea of this paper depends upon the evaluation of the new product organoleptically, chemically and bacteriologically. Also evaluation of the product was done during the time of storage.

MATERIAL AND METHODS

Part I:

Collection of samples:

Twenty random samples of "beef" each weighing 500 grams were collected from different supermarkets in Cairo. All samples were transferred to the laboratory without minimum of delay and subjected to the following.

1- Organoleptic examination:

The color, odor and taste of each sample was determined according to Pearson and Tauber (1984).

II- Chemical examination:

Includes-the determination of the followings:

1- pH was done according to AOAC (1990).
2- Moisture was done according AOAC (1990).
3- Protein by using Kjeldahl method according to AOAC (1990).
4- Crude fat was done according to AOAC (1990).
5- Fat rancidity by kries test quantitatively according to Amer et al. 1975).
6- Uitrites was done according to AOAO (1990).
7- Nacl was done according to AOAC (1990).

III. Microbiological examination:

A. The following microbial counts were done.
1-Total colony by drop plate technique recommended by ICMSF (1978).
2- Enterobacteriacae according to ICMSF (1978).
3- Staph aureus by surface spread technique according to ICMSF (1978).

B. Isolation and identification of the follow
1- Salmonellae according to Harvey and (1981).
2- E.coli according to the method recomm by Mehlmen and Romervo (1982).
3- Staph aureus according to ICMSF (1978).
4- Yersinia enterocolitica according to technique recommended by Lee et al. (19

Part II:

Five complete packages of the product, e weight about two kilograms were kept i refrigerator at the laboratory at 3°C.

One samples from each package was taken ev day for seven successive days. The daily samp were subjected to the following examinations:-

I- Organoleptic.
II- Microbiological.
III-Fat rancidity and pH determination.

RESULTS

Table (1): Organoleptic examination of "Beef" product samples.

	Accepted		Non accepted	
	No.	%	No.	%
Color	16	80	4	20
Odor	17	85	3	15
Taste	18	90	3	15

Table (2) : Chemical and Microbiological examination of the examined samples of the "Beef" product

	Min.	Max.	Mean.	± SE.
pH	6	6.5	6.14	0.03
Moisture	58	63	60.2	0.35
Protein	16	21	18.43	0.29
Fat	18	23	21.04	0.29
Rancidity	0.051	0.088	0.066	0.002
Nitrites	70	79	74.95	0.73
Nacl.	1.3	2.9	2.38	0.11
APC	$9x10^4$	$5x10^7$	$7.8x10^6$	$3.2x10^6$
Enterobacteriacae C.	$6x10^2$	$4x10^4$	$1.2x10^4$	$2.4x10^3$
Staph aureus C.	10^2	10^4	$2.8x10^3$	$6x10^2$

APC = Aerobic plate count
C = Count

Table (3) : Microbial isolates from examined samples of the "Beef" product

Isolates	No.	%
Salmonella	0	0
Staph aureus coagulase positive	1	5
Y.enterocolitica	0	0

Table (4) : Correlation of microbiological and chemical analysis of "Beef"

	APC	Entero.C	Staph c.	pH	Moisture	Protein	Fat	Rancidity	Nitrites	Nacl.
APC	-	0.81	0.43	0.78	0.63	-0.03	-0.28	0.85	-0.62	-0.24
Entero.	0.81	-	0.32	0.82	0.66	-0.08	-0.3	0.83	-0.63	0.66
Staph c.	0.43	0.32	-	0.56	0.56	-0.07	0.07	0.48	-0.3	0.22
pH	0.78	0.82	0.56	-	0.86	0.026	0.003	0.86	-0.60	-0.019
Moisture	0.63	0.66	0.56	0.86	-	0.16	-0.07	0.83	-0.58	0.028
Protein	-0.03	-0.08	-0.07	0.026	0.16	-	0.27	0.14	-0.03	-0.24
Fat	-0.028	0.05	0.037	0.003	-0.19	0.02	-	-0.086	-0.14	-0.018
Rancidity	0.85	0.83	0.48	0.86	0.83	0.14	-0.086	-	-0.74	-0.069
Nitrites	-0.62	-0.63	-0.3	-0.6	-0.58	-0.03	-0.14	-0.74	-	0.2
Nacl.	-0.24	0.06	0.22	-0.019	-0.028	-0.24	-0.03	-0.069	0.2	-

>0 : 0.3 very weak direct correlation
>0.3 : 0.5 weak direct correlation
>0.5 : 0.7 strong direct correlation
>0.7: 1 very strong direct correlation
0 no correlation
> 0 : - 0.3 very weak inverse correlation
>-0.3 : - 0.5 weak inverse correlation
>- 0.5 : - 0.7 strong inverse correlation
>-0.7 : - 1 very strong inverse correlation

Table (5) :Organoleptic changes occurring in the product during experimental storage.

Day	Color				Odor				Taste			
	Accepted		Non accepted		Accepted		Non accepted		Accepted		Non accepted	
	No	%	No	%	No	%	No	%	No	%	No	%
1	5	100	0	0	5	100	0	0	5	100	0	0
2	5	100	0	0	5	100	0	0	5	100	0	0
3	5	100	0	0	5	100	0	0	5	100	0	0
4	5	100	0	0	5	100	0	0	5	100	0	0
5	4	80	1	5	5	100	0	0	5	100	0	0
6	4	80	1	20	4	80	1	20	5	100	0	0
7	3	60	2	40	4	80	1	20	4	80	1	20

Table (6) : Microbiological and chemical changes occurring in the product during experimental storage.

Count \ Day	1	2	3	4	5	6	7
AP	$6x10^5$	$8x10^5$	10^6	$2x10^6$	$3x10^6$	$6x10^6$	$6.1x10^6$
Enterobacteriacae	$6x10^3$	$6.5x10^4$	$6.8x10^3$	$8x10^3$	10^4	$1.3x10^4$	$1.7x10^4$
Staph aureus	$6x10^2$	$8x10^2$	$8x10^2$	10^3	10^3	$2x10^3$	$2x10^3$
Salmonella	0	0	0	0	0	0	0
Staph aureus	0	0	0	0	0	0	0
Y.enterocolitica	0	0	0	0	0	0	0
pH	6.08	6.1	6.2	6.25	6.3	6.34	6.4
Rancidity	0.068	0.070	0.071	0.073	0.077	0.079	0.088

Ap= Arabic plate

Fig (1) pH changse during storage time

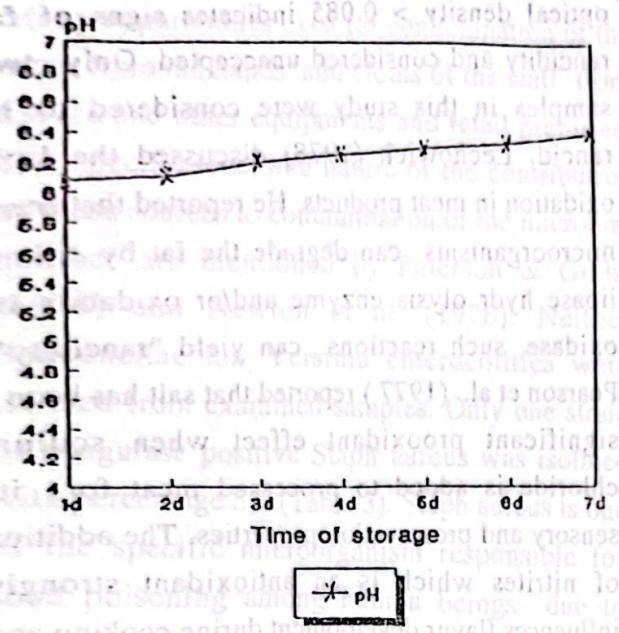


Fig (2) Rancidity changes during storage time

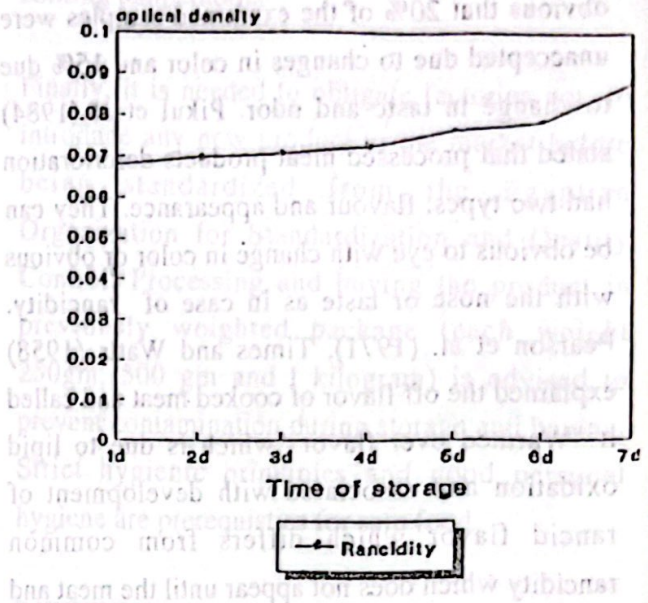
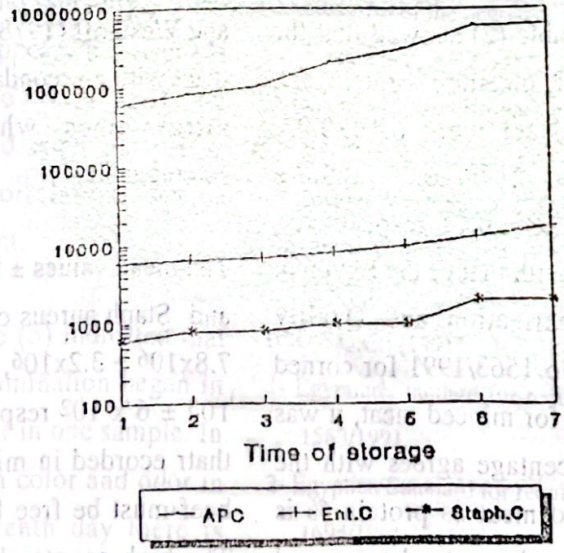


Fig (3) Microbial changes during storage period



APC-aerobic plate count
Ent-enterobacteriacae
C- count

DISCUSSION

From the results achieved in Table (1) it is obvious that 20% of the examined samples were unaccepted due to changes in color and 15% due to change in taste and odor. Pikul et al (1984) stated that processed meat products dererioration had two types: flavour and appearance. They can be obvious to eye with change in color or obvious with the nose or taste as in case of rancidity. Pearson et al. (1971), Times and Watts (1958) explained the off flavor of cooked meat and called it "Warmed over flavor "which is due to lipid oxidation and associated with development of rancid flavor which differs from common rancidity which does not appear until the meat and meat products have been stored for weeks or months. The change in organoleptic criteria may also due to microbial contaminants, the use of spoiled meat or poor sanitation.

The data illustrated in Table (2) showed that the mean values ± SE of pH, moisture, protein, fat, rancidity, nitritis and Nacl were 6.14±0.03, 60.25±0.35, 18.43±0.29, 21.04±0.29, 0.066± 0.001, 74.95±0.73 and 2.38±0.11 respectively. Comparing these figures with that of the Egyptian Organization for Standarization and Quality Control (E.O.S.Q.C.). No 1563/1991 for corned meat and No. 1694/1991 for minced meat, it was found that moisture percentage agrees with the limit recorded for corned meat as protein % is lower than that of corned meat whereas and agrees with that of minced meat. The fat % obtained in this study exceeds that of corned meat and minced meat. Nacl content of the examined samples is similar to that in corned meat but the nitrite value exceeds the permissible limit corned beef. Amer et al (1975) stated that optical density > 0.085 indicates signs of rancidity and considered unaccepted. Only samples in this study were considered to rancid. Lechowich (1978) discussed the lip oxidation in meat products. He reported that so microorganisms can degrade the fat by eith lipase hydr olysis enzyme and/or oxidation oxidase, such reactions can yield "rancidity Pearson et al. (1977) reported that salt has been significant prooxidant effect when sodiu chloride is added to processed meat for i sensory and preservation properties. The additio of nitrites which is an antioxidant strongl influences flavur development during cooking an produces the pink color of cured meat, Gray et al (1984); Pearson and Tauber (1984). Norman and Imes (1978) mentioned that nitrite is effective in preventing the growth of spoilage and food poisoning organisms. On the other hand, Frazier and Westhoff (1978) mentioned that nitrites could react with a secondary or tertiary amines to form nitrosamines which were known to be carcinogenic.

The mean values ± SE of APC, Enterobacteriacae and Staph aureus count for "Beef" samples were $7.8x10^6 \pm 3.2x10^6$, $1.2x10^4 \pm 2.4x10^4$ and $2.8 \times 10^3 \pm 6 \times 10^2$ respectively. These values exceed thatr ecorded in minced meat standards. Corned beef must be free from aerobic microoranisms. The high counts obtained in this study may be due to leaving to the product in the atmosphere outside the refrigerator until selling the product. Under hygienic conditions, the number of pathogens originating from sources outside the

animal are usually very small (Nottingham, 1982). Many opportunities exist for contamination of the meat from the hands and cloths of the staff, from knives and other equipments and retail premises. The specific level and nature of the contribution of these sources to contamination or the microbial number are mentioned by Paterson & Gibbs (1978) and Newton et al. (1978). Neither Salmonellae nor Yersinia enterocolitica were isolated from examined samples. Only one strain of coagulase positive Staph aureus was isolated with percentage 5% (Table 3). Staph aureus is one of the specific microorganism responsible for food poisoning among human beings due to production of powerful enterotoxins as stated by Hobbs and Gilbert (1981).

Regarding Table (4), it is clear that there is a very strong direct correlation between APC and each of (Enterobacteriace count, pH and rancidity). Also this very strong correlation appears between pH and rancidity, Moisture and pH & Enterobacteriaecae count and each of (pH & rancidity). Strong inverse correlation appears between APC and nitrite content.

The results illustrated in Table (5) indicated that the change in organoleptic examination began in the fifth day by change in color in one sample. In the sixth day there is change in color and odor in one sample where at the seventh day there is change in color in 3 samples and change in odor and taste in one sample. The change in odor may be delayed due to the strong spicy flavor which may give false result. Also data in Table (6) and figures (1,2&3) showed the slight gradual increase in microbial counts and the values of pH and rancidity during experimental storage time at chilling temperature.

Finally, it is needed to obligate factories not to introduce any new product to the market before being standardized from the Egyptian Organization for Standardization and Quality Control. Processing and buying the product in previously weighted package (each weight 250gm, 500 gm and 1 kilogram) is advised to prevent contamination during storage and buying. Strict hygienic principles and good personal hygiene are prerequisties for safe food.

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