6 - 34 | IMPROVEMENT THE ACCEPTABILITY OF MIXTURES FROM MINCED CAMEL MEAT AND SOME MEAT SUBSTITUTES .

S.K.El-Samahy , R.A.Taha , F.A.Salem , Sh.A.El-Nemr and M.M.Abd El-Baki . Food Sci. & Techn. Dept. , Faculty of Agric. , Zagazig Univ.

Abstract
Addition of 1% sod. triphosphate to mixtures of minced camel meat and some mixtures of meat substitutes increased their water holding capacity , plasticity and pH value of all samples . Cooking loss was reduced by addition of 1% sod. triphosphate and increasing the percentage level of soy protein isolate and potato flour . Moreover , the acceptability of minced camel meat and mixtures of meat substitutes were improved by addition of a laboratory prepared meat like flower . All samples were more tender than the control one as a result of the addition of 1% sodium triphosphate .

Introduction

Gerrard (1969) stated that the pH adjustment of an intact muscle to 7.0 - 7.4 enables meat fibers or protein to take up and hold their normal water content . On the other hand the meat losses water and solubles when it approaches its isolectric point (pH 5.5) . Therefore, the use of phosphate salts leading to such a pH is helpful . He added that the inclusion of pyrophosphates in a 1% sodium chloride solution will certainly improve the texture of the frankfurters and similar types of sausage and will probably result in a firmer product in cooked sausage containing rusk .

The order of increasing the WHC efficiency by the addition of sodium salts was established by Grau and Hamm (1958) which was as follows : monophosphates, cyclotriphosphate, diphosphate, tetraphosphate and triphosphate .

Ciacino (1968) mentioned that natural beef flavor and aroma were produced from mixtures of cysteine or cystine and their salts with protein hydrolysates . The most useful of those products were obtained from mixtures containing one or more of these acids together with thiamine usually as an acid salt and a protein hydrolysate .

May (1960) indicated that the factors which may affect the nature and quality of the flavor produced included the nature and relative amounts of the monosaccharide and amino reagents used , amount of water presented and the time and temperature of heating . He added that the flavoring substitutes having a preferred aroma and taste were obtained when the rates of cysteine and cystine to monosaccharide were respectively 0.4 : 1 and 2 : 1 by weight . The amount of water present should be at least two or three times like the amount of total monosaccharide reagent , and conducting the reaction at a pH in between 3 and 6 .

This work is a trial for improving the acceptability of the mixtures of minced camel meat and meat substitutes .

MATERIALS AND METHODS

A- Materials

1- Camel meat :

Meat used in this study was obtained from three years old camel animals slaughtered at El-Zagazig abattoir . Samples from boneless shoulders were chosen and brought to the laboratory .

2- Soybeans :

Common variety of soy bean in Egypt - namely Harosoy , has been used for the preparation of soy crud and soy protein . Soy bean was brought from the Egyptian Ministry of Agriculture .

3- Potatoes :

Twenty kilogrammes of potato tubers were brought from the local market in Zagazig governorate .

4- Mutton casing :

Mutton intestines were brought from the Zagazig slaughter house and taken to the laboratory for cleaning and stuffing by minced camel meat and mixture of minced camel meat and meat substitutes .

5- Spices :

A mixture containing (42.5% black pepper , 42.5% coriander , 5% cloves and 5% cinnamon) was used .

B- Methods :

Procedure of processing : According to the method described by Abd El-Baki et al (1981) .

Method of analysis : Water holding capacity (WHC) was determined according to the method described by Smith et al.(1973) , while the cooking loss was established according to El-Samahy and Shehata (1977) . The pH value was measured as described in A.O.A.C. (1970) .

The preference evaluation was carried out as a composite complete incomplete (C - I) block design as explained by Cornell and Schrechengost (1975) .

RESULTS AND DISCUSSION

This study is a trial for improving the acceptability of mixtures from minced camel meat and meat substitutes . In this trial mixtures of soy curd , potato flour and soy protein isolate were prepared where the protein ratio in the produced mixtures was nearly equal to that of camel meat used in this research i.e. 17.6% (Abd El-Baki et al. 1981) . Moreover , these ratios used from those substitutes were that gave the best results when they were added individually (Abd El-Baki et al. 1981) .

It has been thought beneficial to improve the technological quality by rising the WHC and plasticity and consequently decreasing cooking loss as well as improving the flavor of the resultant mixtures .

Data in table 1 show the effect of adding 1% sodium triphosphate to the mixtures of minced camel meat and meat substitutes on WHC , plasticity and pH value . The results revealed that addition of 1% sodium triphosphate to minced camel meat or to mixtures of minced camel meat and meat substitutes has increased the WHC , as it was 75.96% in the control sample , it ranged from 89.80 to 98.16% in the mixtures .

The increase in WHC by addition of 1% sodium triphosphate to the mixtures of minced camel meat and meat substitutes could be ascribed to the change in the pH towards the alkaline reaction as it was clear from the data obtained which was far from the isoelectric point of proteins leading to a higher water holding efficiency. Such results were in agreement with those reported by Bendall (1954) , Hellendoorn (1962) and Gerrard (1969) .

As shown from table 1 the plasticity was also improved by adding sodium triphosphate to the minced camel meat or to the mixtures of minced camel meat and mixtures of meat substitutes . It was 3.37 cm^2 in the case of control sample , and reached 5.16 cm^2 when 1% sodium triphosphate was added . Data obtained are confirmed with

those found by Gerrared (1969) . The presence of sodium triphosphate increased the pH value of the meat or the mixtures of meat and meat substitutes (Table 1) . It is obvious that raising the percentage level of soy protein and potato flour increased WHC in the resultant mixtures of minced camel meat and meat substitutes (Table 1) .

With respect to the plasticity and pH value of the mixtures of minced camel meat and meat substitutes , data revealed that they decreased by raising the percentage level of soy protein and potato flour in the mixtures of meat substitutes .

Regarding the effect of adding 1% sodium triphosphate to the mixtures of minced camel meat and meat substitutes on the cooking loss data in table 2 show that there is a decrease in the cooking loss values , as it was 38.88% in the case of the control sample , it reached 18.44% when 1% sodium triphosphate was added . However, raising the percentage level or soy protein flour in the mixture of added meat substitute decreased its cooking loss . As shown from results recorded in table 2 , it is quite clear that cooking loss during the last 10 minutes of cooking time was higher in the presence of sodium triphosphate than case of its absence . The average of cooking loss reached 9.59% during the last 10 minutes of cooking time when 1% sodium triphosphate was added .

To improve the acceptability of the resultant mixtures of minced camel meat and meat substitutes , many trials were carried out to produce a product containing meat like flavor . The trial which gave the best flavor was adopted . Preference evaluation of the resultant mixtures produced from adding the prepared solution containing meat like flavor to the mixture of minced camel meat and mixtures of meat substitute was tested for the following qualities , flavor , color , tenderness and over all acceptability .

Table 3 shown the average scores of qualities of mixtures of minced camel meat and mixtures of meat substitutes containing meat like flavor . It is quite clear that adding a solution containing meat like flavor significantly improved the acceptability of the mixtures of minced camel meat and meat substitutes (Table 3) .

Regarding the flavor of the resultant sausage prepared from the mixture of minced camel meat and mixtures of meat substitutes , soy crud , potato flour and soy protein isolate , it was noticed that the flavor of all mixtures was significantly better than the control sample except the mixture of minced camel meat and meat substitutes which contained 15% soy crud , 9% potato flour and 6% soy protein isolate .

On the other hand , the change in color was not significant except in the case of sample (D) which contained 20% soy crud , 6% potato flour and 4% soy protein .

With respect to the tenderness , all sausages prepared from the mixtures of minced camel meat and mixtures of meat substitutes were significantly more tender than that prepared from minced camel meat only . All samples showed a significant increase in the over all acceptability of the resultant sausage prepared from mixtures of meat substitutes when a solution containing meat like flavor was added .

So , it could be concluded that addition of 1% sodium triphosphate to the mixtures of minced camel meat and meat substitutes can be recommended for improving their quality , as well as adding a meat like flavor to such mixture to increase their acceptability .

REFERENCES

Abd El-Baki,M.M. , S.K.,El-Samahy , F.A.,Salem , R.A.,Taha and Sh.A.,El-Nemr . Some studies on meat substitutes . 1- Physical and chemical properties of minced camel meat and some meat substitutes . Conference of Development of food techno. Under Press , Cairo , A.R.E. March 1981 .

A.O.A.C. Official Methods of Analysis . Association Of Official Analytical Chemists, 1970 .

Bandall,J.R. Water holding capacity and juiceness . C.F. Meat Science "Second ed." Laweric,R.A. Pergemon Press Ltd. , Meadington Hill , Oxford , P. 304 , 1954 .

Cornell,J.A. and J.F.,Schrechengost . Measuring penelists consistency using composited complete - incomplete block designs . J.Fd.Sci. 40(5)1130 - 1133 , 1975 .

El-Samahy,S.K. and M.M.,Shehata . Studies on camel meat tenderization . Annals of Agric. Sco. , Moshtohor , Vol. 8 , 105 - 117 , 1977 .

Grau,R. and R.,Hamm . Water holding capacity and juiceness . C.F. Meat Sci. "Second edition" Laweric,R.A. Pergemon Press Ltd. , Meadington Hill Hall Oxford , 1958 .

Gerrard,F.M. Sausage and small goods production . London Hill Books, London, 1969 .

Giuscino,C. Meat flavor reaction of proteinaceous substances on S-containing compound U.S.Patent 3, 394, 15 July 23 , 1968 .

Helleudoorn,E.W. Water holding capacity of meat as affected by phosphates . Food Technology , 16 (8) , 119 - 123 , 1962 .

May,C.G. A review of thermally produced initiation flavors . J.Agric.Fd.Chem.23, 1033 , 1960 .

Smith,G.C. , J.,Hyunil , L.,Carpenter and C.M.,Cater. Efficiency of protein additives as emulsion stabilizers in frankfurters . J.Fd.Sci. 38, 849 - 855 , 1973 .

Table (2): Effect of adding 1 percentage sodium triphosphate to mixtures of minced camel meat and mixtures of meat substitutes[x]; on cooking loss.

Sample No. \ cooking Time	Cooking loss at boiling for 15 minutes	frying for 5 minutes
	%	%
Control	41.24	52.31
A	28.03	35.22
B	18.48	22.21
C	9.89	13.02
D	6.3	10.25
E	3.25	5.32

A : Minced camel meat.

B : Mixture containing 70% minced camel meat and 30% soy curd.

C.: Mixture containing 70% minced camel meat, and 25% soy curd, 3% potato flour, and 2% soy protein isolate.

D : Mixture containing 70% minced camel meat, 20% soy curd, 6% potato flour, and 4% soy protein isolate.

E : Mixture containing 70% minced camel meat, 15% soy curd, 9% potato flour, and 6% soy protein isolate.

x Soy curd, potato flour, and soy protein isolate.

Table ( ]) : Effect of adding 1% sodium triphosphate to mixtures of minced camel meat and mixtures of meat substitutes[x] on WHC and ph value.

Sample number	Water holding capacity (%)	Plasticity (cm^2)	pH value
Control	75.96	3.37	6.32
(A)	89.80	5.16	6.70
(B)	92.21	4.64	6.65
(C)	93.76	4.00	6.55
(D)	96.08	3.60	6.40
(E)	93.16	3.01	6.30

where :

(A) Minced camel meat.

(B) Mixture containing 70% minced camel meat, and 30% soy curd.

(C) Mixture containing 70% minced camel meat, 25% soy curd 3% potato flour, and 2% soy protein isolate.

(D) Mixture containing 70% minced camel meat, 20% soy curd, 6% potato flour, and 4% soy protein isolate

(E) Mixture containing 70% minced camel meat, 15% soy curd, 9% potato flour, and 6% soy protein isolate.

x Soy curd, potato flour, and soy protein isolate.

Table (3) Average scores of qualities for sausage made from minced camel meat and mixtures of meat substitutes[xx], and suplemented with 1% sodium triphosphate and meat like flavor.

Quality	A	B	C	D	E	L.S.D.
Flavor	3.52	3.94[x]	3.89[x]	3.85[x]	3.65	0.34
Color	3.83	3.46	3.48	3.30[x]	3.56	0.43
Tenderness	3.46	3.83[x]	3.89[x]	3.80[x]	3.93[x]	0.21
Over all acceptability	3.44	3.83[x]	3.81[x]	3.81[x]	3.78[x]	0.27

x Singificant difference.

where:

A: The control sample.

B: Mixture containing 70% minced camel meat and 30% soy curd.

C: Mixture containing 70% minced camel meat, 25% soy curd, 3% Potato flour, and 2% soy protein isolate.

D: Mixture containing 70% minced camel meat, 20% soy curd, 6% potato flour, and 4% soy protein isolate.

E: Mixture containing 70% minced camel meat, 15% soy curd , 9% potato flour, and 6% soy protein isolate.

xx Soy curd, potato flour, soy protein isolate.