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UTILIZATION OF SOME FAT SUBSTITUTES IN PROCESSING OF LOW FAT SAUSAGES

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ABSTRACT

Low- fat (8%, 12% or 16%) beef sausages containing 5% Whey Protein Concentrate (WPC), 5% Texturized Soy Flour (TSF) or 0.3% Iota Carrageenan (IC) as fat-replacers, were compared to high fat (25%) beef sausages as control. Low-fat beef (8%) sausages formulated with WPC improved tenderness, cooking yields, and fat retention comapred to other formulas of beef sausages. The low-fat (8%, 12% or 16%) beef sausages formulated with IC have the lower shrinkage. Thiobarbituric acid value (TBA) and total volatile nitrogen (TVN) increased after cooking in low-fat beef sausages formulated with WPC, TSF or IC. On the contrary, the high fat beef sausages (control) have higher significant values ($P > 0.05$) for cooking loss, shrinkage, TBA and TVN, and lower values for tenderness, moisture retention, fat retention, taste, color, texture and overall acceptability. Use of WPC, TSF and IC as fat replacers in low fat beef sausages, especially 8% fat TSF and 8% or 12% fat WPC improved tenderness, cooking yield and overall acceptability, without negative effects on flavor and eating quality.

Key words: *beef sausage, iota carrageenan low fat ,sensory evaluation ,texturized soy flour,whey protein concentrate.*

1. INTRODUCTION

Ground beef is a popular meat purchase. It is one of the least expensive beef products available to consumers. However, it has been reported that consumers discriminate against ground beef with high fat content because of excessive shrinkage and splattering during cooking, its implication as a cause of obesity and its greasy taste (Cross *et al.*, 1980 and Bruhn *et al.*,1992) . Increased demand for low fat meat products has resulted in the development of a variety of fat substitutes. Several studies have evaluated the replacement of fat with water (Claus *et al.*, 1989 and Ahmed *et al.*, 1990), carbohydrates (Berry and wergin 1990 and Becker 1996) and non-meat proteins (Claus and Hunt 1991). The low-fat meat products were evaluated by Rhee and Smith (1983) and Kai-Kai *et al.*, (1997). Their results showed that meat products such as sausage, frankfurters, pork sausage patties and ground beef patties, which were prepared to contain low fat by using 10-30% of rehydrated textured soy protein (TSP), 5-10% of dried soy tofu powder or carrageenan (0.5%), had the lowest choloesterol retention content, and were not significantly different from meat products containing high fat content (20%).

El-Magoli *et al.*, (1995) showed that fat replacers may be protein-based, carbohydrate-based or fat-based constituents. Carbohydrate-based fat replacers; *i.e.*, iota-carrageenan and kappa-carrageenan provide moisture retention and improve sensory properties of low-fat (< 10%) ground beef. However, with respect to protein-based fat replacers, the ability of various proteins such as soy, corn and milk proteins to provide texture, mouth-feel and water binding is mainly related to the types of protein-protein interaction. Therefore, whey protein concentrate (WPC) has been used as filler, binder and extender to improve the flavor, texture, appearance, cooking characteristics and nutritive value of comminuted meat products such as sausage, turkey rolls, meat loaves and meat patties as well as providing a great flexibility of formulations to minimize processing losses. (Lee *et al.*, 1990). However, the results of Hughes *et al.*, (1997) and Hughes *et al.*, (1998) indicated that decreasing fat content by using carrageenan and oat fiber replacers or tapioca starch (*Cassava starch*) and whey protein significantly reduced cooking loss and increased both water holding capacity and emulsion stability in the frankfurters of 5% fat than in that of 12% fat.

Moreover, Anderson and Berry (2000) found that lower fat (10% and 14%) ground beef patties containing inner pea fiber as dry powder or as part of a high fat mixture improved tenderness and cooking yields without negative effects on juiciness and flavor as compared to high fat beef patties (18%). In addition, Chin *et al*., (2000) reported that konjac blends and soy protein isolate can be incorporated in low-fat bologna formulations as fat replacers without detrimental physico-chemical and textural characteristics on the products, except for color values.

On the other hand, Mendoza *et al*., (2001), studied the effect of using inulin (RaftilineST) as a fat substitute in dry fermented sausages, and found that sensory properties of the low fat sausages containing inulin were improved, demonstrating texture similar to the high fat sausage. The objective of this study was to evaluate the chemical, physical and sensory properties of low fat (8%, 12% and 16%) beef sausages containing whey protein concentrate (5%), texturized soy flour (5%) or iota- carrageenan (0.3%), as compared to control beef sausage (25% fat).

2. MATERIALS AND METHODS

2.1. Meat Frozen boneless beef from male hind quarter (silver side) was purchased from a private shop at Giza. The lean meat was ground separately through 6.2 mm plate (home mincer) and used for analysis and for preparation of different sausage formulas.

2.2. Fat replacers

2.2.1. Textured Soy Flour (TSF) was purchased from the Food Technology Institute (Soya Center) of the Agricultural Research Center, Giza. It contained 4.5% moisture and was finely powdered by using a mill in the laboratory. Textured soy flour (TSF) was prepared by rehydration (by mixing one part of TSF with two parts of tap water), then, the rehydrated textured soy flour was added to the meat according to Rhee and Smith (1983).

2.2.2. Whey Protein Concentrate (WPC) was imported from Denmark (producer is Denmark Protein A/S) with 6.4 % moisture content. Whey protein concentrate was first hydrated with 10% added water by mixing it for 15 minutes using an electrical stir plate. The resulting thick slurry was kept overnight at 4^0C before it was added with salt to the meat and mixed thoroughly as described by El-Magoli *et al.*, (1996).

2.2.3. Iota Carrageenan (IC) was obtained from Misr Food Additives at Haram (producer is Copenhangen Pectin A/S). It was first hydrated with 10% added salt solution (5% NaCl) by mixing it for 15 minutes using an electrical stir plate. The resulting thick slurry was kept overnight at 4°C before it was added with salt to the meat and mixed thoroughly as described by Hughes *et al.,* (1997).

2.3. Spices (cardamon, celery, ascorbic acid, marjoram, sodium glutamate, mace, lactose, nutmeg, white and black pepper) were obtaind from local market at Giza. The spices were powdered in the laboratory by a mill. Then, a mixture of the powdered spices was prepared according to Reinhardt (1994) as follows: (cardamom in husk, 0.10%, nutmeg 0.12% lactose,0.2%, mace,0.2%, glutamate, 0.12% celery, 0.04%, ascorbic acid, 0.04%, marjoram, 0.1%, white and black pepper, 0.3%).

2.4. Preparation of sausages Each formula of sausage was prepared by mixing the minced frozen beef with other ingredients for 8-10 minutes into the emulsifier , using a laboratory emulsifier (Hobbart kneading machine). The control formula was as follows: (10% water, as ice flakes, 56.92% minced frozen beef, 23.64% minced fat tissues, 1.4% skim milk, 4% potato starch, 1.6% sodium chloride, 1.22% fresh garlic, and 1.22% spices mixture). The obtained emulsion was stuffed in previously cleaned and prepared natural mutton casings. Other formulas of sausages, were prepared to contain three different levels of fat (8 %, 12%, or 16%), and each formula with each level of fat contained (5% TSF,5% WPC or 0.3% IC). After preparing each formula the sausage samples were packaged in polyethylene bags and stored frozen at- 18°C .

2.5. Chemical analysis

2.5.1. Chemical composition The moisture, protein, fat, ash and total carbohydrates contents of raw materials and sausage samples were determined according to the A.O.A.C. (1995).

2.5.2. Determination of pH values The pH value of each sample was determined according to the method described by Hood (1980).

2.5.3.Thiobarbituric Acid Value (TBA) TBA values were determined according to the method of Tarldgis *et al.*, (1960).

2.5.4.Total Volatile Nitrogen (TVN) TVN was determined according to the method described by Winton and Winton (1958).

2.6. Physical analysis:

2.6.1. Determination of cooking loss Total cooking losses of prepared samples were determined and calculated as described by El-Nemer (1979). This measurement was determined after boiling in water for 15 minutes, then frying in cotton seed oil at 110°C for 5 minutes. Total cooking losses were calculated as follows:

$$\%\text{Cooking loss} \quad \frac{\text{Fresh sample weight} - \text{Boiled sample weight}}{\text{Boiled sample weight}} \times 100$$

$$\%\text{ Frying loss} \quad \frac{\text{Boiled sample weight} - \text{Fried sample weight}}{\text{Boiled sample weight}} \times 100$$

2.6.2. Measurement of tenderness: The warner-Bratzler shear force apparatus was used to measure the tenderness of boiled sample. After cooling to room temperature, the sample (10 cm long) was sheared three times at different positions,and the average shear force was calculated. Low shear values indicated high tenderness as reported by Herring (1976).

2.6.3. Determination of fat and moisture retention: The moisture retention value represents the amount of moisture retained in the cooked product per 100 gm of raw sample, and it was determined according to the equation adopted by El-Magoli *et al.*,(1996) as follows:

Moisture retention =

$$\frac{\text{Percentage yield X Percentage moisture in cooked product}}{100}$$

The fat retention to ascertain the amount of fat retained in the product after cooking, was calculated according to the following equation adopted by Berry (1993) as follows:

Fat retention =

$$\frac{\text{Cooked weight X Percentage fat in cooked product}}{\text{Raw weight X Percentage fat in raw product}} \text{ X } 100$$

2.6.4. Determination of shrinkage: Shrinkage value of each sample after cooking (boiling and frying) was determined according to the following equation adopted by Adams (1994) as follows:

Shrinkage (%) =

$$\frac{\text{Raw thickness - Cooked thickness + (Raw diameter-Cooked diameter)}}{\text{Raw thickness + Raw diameter}} \text{ X } 100$$

2.7. Sensory evaluation: Cooked samples were evaluated using a descriptive sensory analysis method according to the method described by Hemeida and Salama (1992).

2.8. Statistical analysis: Data of sensory evaluation were analyzed using the analysis of variance and Duncan's multiple range test (Steel and Torrie, 1980) was used to assess significance among treatment means.

.3. RESULTS AND DISCUSSION

3.1. Chemical composition and chemical properties

From the results in Table (1), it could be concluded that chemical composition and chemical properties of imported frozen beef meat coincided with the limits of Egyptian Organization for Standardization and Quality Control (1991) which indicate that TBA, TVN and pH of frozen meat should be 0.9 mg/kg sample, 20 mg/100 gm sample and (5.6 - 6.2), respectively. Therefore, this meat was suitable for preparing required sausages. In addition, the results in Table (1) showed that, WPC had higher protein and lower fat contents than that of TSF. This is required and important to bind water and considered suitable for manufacturing low fat meat sausages.

Table (1): Chemical composition and chemical properties of imported frozen beef meat and some fat replacers.

Constituent (%) (wet weight)	**Imported frozen lean** beef	**Fat replacers**	
		Whey Protein Concentrate (WPC)	Texturized Soy Flour (TSF)
Moisture	75.94	6.42	4.52
Protein	20.95	71.29	45.93
Fat	2.13	3.16	7.13
Ash	0.98	3.82	6.52
Carbohydrates	0.00	15.31	35.90

Chemical properties

T.B.A value (mg malonaldehyde/kg sample)	0.060
T.V.N. mg/100gm sample	14.16
pH	5.90

Iota carrageenan (IC) is a polysaccharide.

3.2. Chemical composition of meat sausages

In Table (2), it could be noticed that the 8% fat beef raw sausages had higher moisture content than the 12% and 16% fat sausages, while the cooked control samples had the lowest moisture content than the other beef sausages. However, after cooking, the moisture content of the 12% fat IC sausages was similar to that of the 8% fat WPC sausages. As expected, increases in the level of fat resulted in decreased moisture content. These findings coincided with the results reported by Bullock *et al.,* (1994), Anderson and Berry (2000), and Brewer *et al.,* (1992) who found that carrageenan has the ability to make complex matrix with water.

Protein content was higher in the 8% fat beef raw sausages compared to the 12 % and 16 % fat raw sausages . After cooking , the

Table (2): Chemical composition of both raw and cooked meat sausage samples as affected by different fat replacers.

Chemical Composition	Control beef sausage (25% fat)	Sausage formulas								
		With 5% whey protein Conc. (WPC)			With 5% texturized soy flour (TSF)			With 0.3% iota carrageenan (IC)		
		8% fat	12% fat	16%fat	8% fat	12%fat	16%fat	8%fat	12%fat	16%fat
I.Raw samples:										
Moisture	60.19	65.92	63.00	60.98	66.78	64.28	61.38	68.30	65.78	63.35
Protein	12.30	18.89	16.86	15.12	17.73	15.61	13.96	16.08	14.22	12.91
Ash	2.13	2.51	2.73	2.91	3.86	4.26	4.96	2.91	3.38	4.06
Total carbohydrates*	0.38	4.68	4.81	4.99	3.63	3.85	3.70	4.71	4.62	3.68
II Cooked samples:										
Moisture	58.46	63.43	61.78	58.85	63.82	62.36	59.06	64.93	63.88	61.45
Protein	17.69	23.56	21.36	19.88	21.52	19.78	17.43	20.05	18.12	16.96
Ash	2.08	2.06	2.26	2.61	3.15	4.08	5.11	2.76	2.98	3.12
Fat	21.43	6.79	9.97	13.78	7.5	10.36	15.34	7.48	10.86	14.60
Total carbohydrates*	0.34	4.16	4.63	4.88	4.01	3.42	3.06	4.78	4.16	3.87

* Calculated by differences.

protein content increased in all sausage formulas (Table 2), while the control raw beef sausages had the lowest protein content. This increase may be due to the decreased moisture content of cooked low-fat sausages (Brewer *et al.,* 1992).

On the other hand, it could be noticed that the ash content of all-low fat formulas decreased after cooking, and the 16 % fat TSF beef raw sausages had the highest ash content. The decrease in ash content may be due to the release of some soluble minerals during cooking of low fat sausage samples (Cross *et al.,* 1980).

3.3. Chemical changes of meat sausages

Figures (1,2 and 3) show the changes of TBA, TVN , and pH values of both raw and cooked meat sausages as affected by using different fat replacers. These figures indicate that the cooked meat sausages contain higher values of TBA, TVN and pH than the raw samples, while the control samples either raw or cooked had the highest values of TBA, and pH as compared to the other samples which contain fat replacers. However, after cooking, the 16% fat IC sausages had higher TBA value as compared to the other treatments (Fig.1). In addition, the 8% fat TSF sausages had the highest TVN as compared with other treatments (Fig. 2), while the 16% fat TSF sausages had the highest pH value among other treatments (Fig.3). These results may be due to the free sodium chloride (salt) in these sausages which induced oxidation in the presence of oxygen (Rhee, 1988), and the high pH value may be due to the high pH values found in the soy extender products as reported by Brewer *et al.*, (1992).

3.4. Physical changes of meat sausages

Table (3) reveals that cooking loss of control meat sausage was higher as compared to the other meat sausage samples. It was found that sausages containing (8% fat + WPC) had the lowest cooking loss, followed by the formula containing (12% fat + WPC). On the contrary , the highest cooking loss was found in sausages containing (16% fat + TSF). These results coincided with the findings which indicate that cooking loss increased as fat content increased (Bullock *et al.,* 1994).

Table (3) indicates that the highest moisture retention was found in the treatments containing fat replacers as compared to control

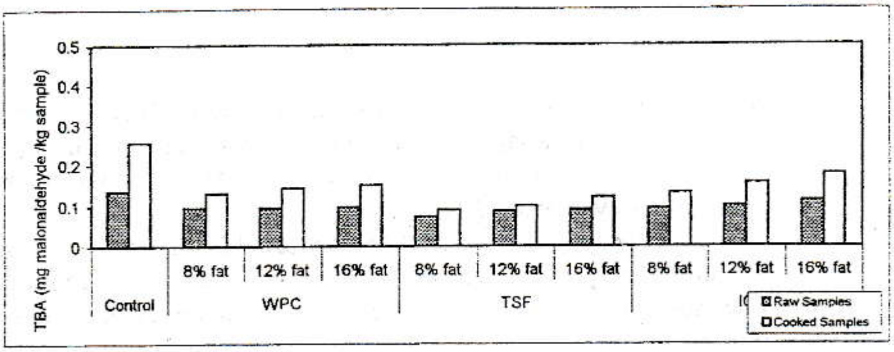

Fig. (1): Thiobarbituric acid values (TBA) of both raw and cooked beef sausages as affected by different fat replacers.

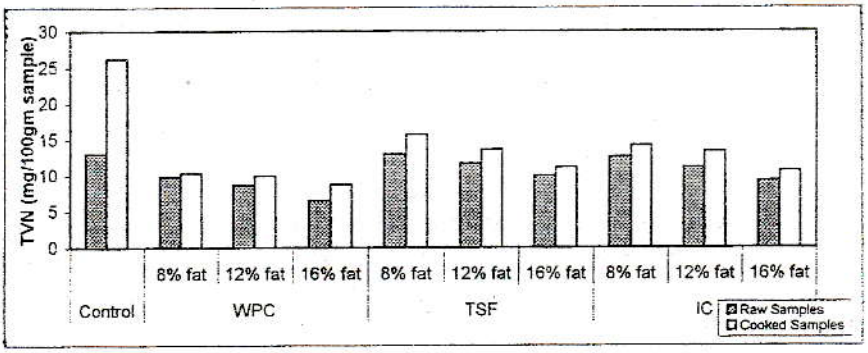

Fig. (2): Total volatile nitrogen (TVN) of both raw and cooked beef sausages as affected by different fat replacers.

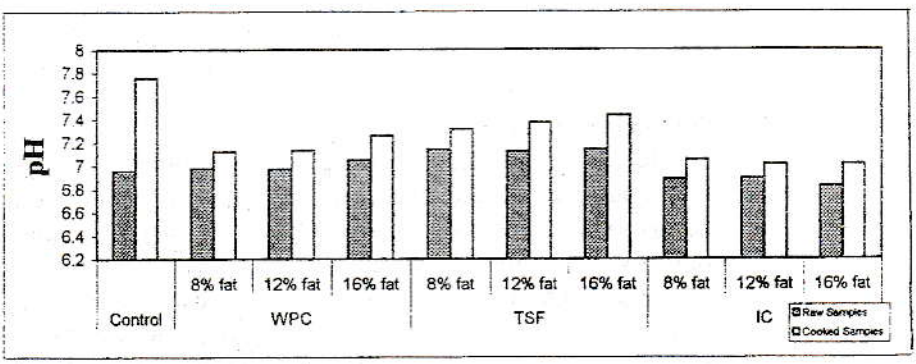

Fig.(3): pH value of both raw and cooked beef sausages as affected by different fat replacers.

WPC: whey protein concentrate.

TSF: Texturized soy flour.

IC: Iota carragennan.

Table (3): Physical changes of meat sausage samples as affected by different fat replacers.

Parameters	Control (25% fat)	Whey protein conc. (WPC) 5%			Texturized soy flour (TSF) 5%			Iota caragenan (IC) 0.3%		
		8% fat	12% fat	16% fat	8% fat	12% fat	16% fat	8% fat	12% fat	16% fat
Total cooking loss%	23.15	13.63	13.88	21.35	15.99	16.50	21.68	17.79	18.22	20.40
Moisture retention%	48.55	53.83	53.09	46.12	51.51	51.18	46.81	52.85	50.25	47.50
Shrinkage %	24.00	16.85	12.09	22.25	11.12	13.52	14.34	10.52	18.50	12.35
Fat retention%	41.36	97.55	83.87	61.69	87.98	82.27	72.89	95.08	85.27	60.91
Tenderness (low shear value)	4.30	4.00	3.70	4.70	3.50	2.80	3.40	4.30	3.30	4.20

Table (4): Sensory evaluation scores (mean value*) of meat sausage samples as affected by different fat replacers.

Parameters	Control (25% fat)	Whey protein conc. (WPC) 5%			Texturized soy flour (TSF) 5%			Iota caragenan (IC) 0.3%		
		8% fat	12% fat	16% fat	8% fat	12% fat	16% fat	8% fat	12% fat	16% fat
Color	8.30^{a}	8.40^{a}	8.10^{a}	8.35^{a}	8.40^{a}	8.30^{a}	8.65^{a}	8.65^{a}	8.30^{a}	8.35^{a}
Taste	8.30^{a}	8.75^{a}	8.8^{a}	8.50^{a}	8.90^{a}	8.80^{a}	8.30^{a}	8.35^{a}	8.70^{a}	8.45^{a}
Aroma	8.10^{a}	7.85^{ab}	7.50^{ab}	7.90^{ab}	8.90^{b}	9.00^{b}	8.75^{b}	8.10^{a}	8.25^{a}	8.10^{a}
Texture	8.35^{a}	8.25^{a}	8.45^{a}	8.25^{a}	8.60^{a}	8.50^{a}	8.60^{a}	7.85^{a}	8.25^{a}	8.55^{a}
Overall acceptability	8.35^{a}	8.40^{a}	8.35^{a}	8.50^{a}	8.80^{a}	8.65^{a}	8.65^{a}	8.30^{a}	8.30^{a}	8.40^{a}
SEM	0.3652	0.3562	0.3492	0.3398	0.3762	0.3765	0.3992	0.3654	0.3768	0.3687

* means within each row with different superscripts are significantly different ($P < 0.05$).

SEM: Standard error of the means.

sausages. This may be due to the heat gelation and emulsification properties which enhance moisture retention as reported by El-Magoli *et al.,* (1996). The high moisture retention of samples is probably due to the ability to bind fat and water, as described by Wolf (1970), resulting in decreasing of cooking loss as shown in Table (3). Moreover, the carrageenan as fat substitutes also improved the moisture retention of treatments. This may be due to the physical entrapment of protein and water as reported by Defreitos *et al.,* (1997). Although the low-fat meat susages had higher moisture retention than control, the difference between these treatments and control was not large, which may be due to the cooking loss of low- fat meat products (Cross *et al.,* 1980).

Table (3) shows that tenderness was higher for sausage samples prepared with WPC followed by those containing IC, then the samples containing TSF. These results coincided with the findings reported by Berry (1993) and Ravin and Zays (1992). Sausages formula containing (12% fat + WPC) has the highest tenderness scores. These findings confirm with the observation of El - Magoli *et al.,* (1996) who found that a reduction in the fat level from 22 to 11% increased the textural parameters and consequently improved the tenderness.

Concerning the shrinkage values, the data presented in Table (3) show that fat substitues improved the shrinkage values of low-fat sausage samples as compared to control samples. The sausage samples which contained 8% fat + IC had the lowest shrinkage value (10.52%) followed by those containing 8% + TSF (11.12%). These lower shrinkage values agreed with the observation of El-Magoli *et al.,* (1995) who reported the reduction of fat level from 22 to 11% improved cooking parameters.

Moreover Table (3) shows that all additives, as fat substitutes resulted in increasing of fat retention of low fat sausages when compared to high-fat sausages without additives (control) which is probably due to the functional properties of fat substitutes. Also the results showed the high fat retention for sausages containing WPC and IC when compared to control samples. This coincides with the low shrinkage and cooking loss for these treatments. These results agree with those of Cross *et al.,* (1980) who found that as the percentage of fat increased in the raw product, fat loss during cooking also increased.

3.5. Sensory evaluation of meat sausages:

The statistical analysis of color, taste, aroma, texture and overall acceptability of high-fat sausages (control) and low-fat sausages formulated with different fat levels (8, 12 and 16 % fat) and fat substitutes (WPC, TSF and IC) are shown in Table (4). From the results it could be noticed that the color scores for all the prepared sausage (the treatments) were rather similar, hence, the lowest value was 8.10 for the treatment which contains (12% fat + WPC) and the highest value was 8.65 for the treatments containing either (8% fat + IC) or (16% fat + TSF). Therefore, the differences between samples were not significant ($p< 0.05$). Meanwhile, the taste values were similar for all the tested samples except that of control and samples containing IC. The aroma values of all samples were also similar except samples containing WPC. Meanwhile, the texture scores were also similar for all the prepared samples. This is probably due to the presence of some additives which act as binders, extenders and emulsifiers resulting in improving the texture of low-fat meat sausages (Foegendig and Ramsey, 1986). The overall acceptability values were found to be practically similar for all sausage samples. Therefore, the differences among these samples were not significant ($p < 0.05$) as shwon in Table (4). These results agree with the findings of Lecomte *et al.*, (1993) who showed that the utilization of soya proteins resulted in finished products with improved sensory characteristics and enhanced functional properties.

Finally, it could be noticed that the incorporation of fat substitutes such as WPC, TSF and IC with 8, 12 and 16% fat had no significant effect ($p < 0.05$) on the parameters (color , taste , texture and overall acceptability) of prepared sausages as shown in Table (4). In contrast, the differences among prepared samples were only significant ($p > 0.05$) for aroma , especially samples containing TSF or WPC. This is probably due to the presence of some different odor substances in these additives as fat substitutes (Liu *et al.*, 1991) which might affect the aroma of these sausages. Consequently, it could be concluded that sausage samples which contain TSF or WPC were the best treatments especially the ones containing 12 % fat.

CONCLUSIONS

Whey Protein Concentrate (WPC), Texturized Soy Flour (TSF) and Iota Carrageenan (IC) have been used for processing low-fat beef sausages at 8% , 12% and 16% fat. These fat replacers offer the processor opportunity to improve tenderness and cooking yield, without negative effects on texture and flavor. Inclusion of WPC, TSF and IC in ground beef formulations may allow the low-fat sausages to withstand prolonged heating while producing high cooking yields and acceptable eating quality. In conclusion, low-fat beef sausages formulated with 5% WPC have the most acceptable values for fat retention, tenderness and cooking yield in comparison with those containing 5% TSF or 0.3% IC.

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الإستفادة من بعض بدائل الدهون فى تصنيع السجق منخفض الدهن

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ملخص

تم مقارنة السجق البقرى منخفض الدهن المحتوى على ٨%، ١٢% أو ١٦% والمصنع باستخدام كل من بروتين مركز من شرش الجبن (WPC) بتركيز ٥% ، دقيق الصويا منزوع الدهن (TSF) بتركيز ٥% أو الأيوتا – كارجينان (IC) بتركيز ٣ر٠% ، حيث كانت العينة الضابطة للمقارنة تحتوى على نسبة ٢٥% من الدهن. واظهرت النتائج أن السجق ٨% دهن والمخلوط بالـ WPC أدى إلى تحسين الطراوة والطبخ ودرجة الاحتفاظ بالدهن مقارنة بجميع الخلطات الأخرى المستخدمة. أعطى السجق المحتوى على ٨% ، ١٢% أو ١٦% دهن والمخلوط باستخدام الـ IC أفضل النتائج بالنسبة لدرجة الانكماش .

دلت نتائج تقدير حامض الثيوباربيوتريك (TBA) ، والمواد النيتروجينية الطيارة (TVN) على أن الطبخ (فى جميع العينات المستخدمة) أدى إلى ارتفاع قيمتها. وعلى العكس كانت عينات السجق مرتفعة نسبة الدهن (العينة الضابطة) تحتوى على أعلى قيم لكل من معدل الفقد اثناء الطبخ ودرجة الانكماش وقيمة الـ TBA والـ TVN وأقل قيم لكل من الطراوة ونسبة الاحتفاظ بالدهن والطعم واللون والقوام والخواص العامة المرغوبة .

كان إستخدام الـ WPC، TSF ، IC كمواد بديلة للدهن فى انتاج السجق البقرى منخفض الدهن خاصة المحتوى على ٨% دهن والمخلوط بالـ TSF أو المخلوط بالـ WPC عند نسبة دهن ٨% أو ١٢% أفضل الخلطات فى تحسين الطراوة ومعدل الطبخ والخواص العامة المرغوبة للمنتج بدون حدوث أى تغيرات غير مرغوبة سواء فى النكهة أو الطعم ودرجة الجودة للأكل .

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