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ADDING DIFFERENT FATTY TISSUES TO CHICKEN BURGER AND THE EFFECT OF THIS ON THEIR QUALITATIVE AND STORAGE QUALITIES

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Abstract
The study included the manufacture of the chicken burger product by adding various fatty tissues that included of sheep fat tail tissues, calf hump and camel hump, as well as belly fat for sheep, calf and camels at a rate of 10% for each treatment, burgers pieces were formed with a weight of (50) grams, thickness of (7) mm and diameter of (11) cm. The burger pieces stored in plastic containers under frozen storage conditions at -18 C and for a period 45 days. Physicochemical and qualitative changes were studied during that period. The chicken burger indicated pH (7.9).) Added to the sheep fat tail tissues to reach (5.4) after frozen storage -18 Celsius for 45 days. The chicken burger also indicated a percentage of bound water that reached (71.24) % added to the fat of the sheep fat tail tissues , to decrease to (66.9)% after 45 days of frozen storage. While the percentage of free fatty acids in chicken burgers (0.12 – 0.41) % in the burger added to it camel hump and sheep fat tail tissues respectively, the percentage of tri glycerides in chicken burger ranged between (104 – 372) mg / dL. While the cholesterol content in the chicken burger ranged (30.8 -77.4) mg/dL in the burger with belly fat added. The amount of the iodin number (4.06 –35.53) % in the chicken burger. The peroxide number (20-40)% ranged in the chicken burger. The melting point of chicken burger fat also ranged from 38 to 45 degrees Celsius. The sensory evaluation of the chicken burger received a sensory rating (8.3– 9) for the color trait, (8.3 –9) for the flavor trait, (7.3 – 8.3) for the juiciness trait, (8.1– 9) for the aroma trait and (7.3– 8.0) for the trait of general acceptance.

Keywords: chicken Burger , fatty tissues, peroxide number, frozen storage

Introduction

Fat has an important role in processed meat products such as reducing loss during cooking, increasing the stability of meat emulsion, improving organoleptic properties and providing the ability to hold water, **(Rather et al., 2015).** As stipulated by the World Health Organization. However, reducing fat percentages may cause some problems related to product acceptance, because fat is an important element that affects the properties of meat products such as flavor, sensory traits and texture, and fat is an important component of processed meat products and contributes significantly to their freshness, juice, palatability, structure and stability. **(Youssef and Barbut, 2011)** Animal meat contains

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different amounts of fats such as beef, sheep and poultry fats and is consumed in large quantities while the unfit for food consumption goes to the soap industry and animal fats extracted such as lamb, beef and poultry are suitable for human food consumption Called dietary fats, all meat fats form by-products in the meat industry i.e. their availability is associated with meat production and the consumption of animal fats has decreased due to the presence of saturated fatty acids that reach more than 50% and cholesterol to more than 1000 mg / kg . Fats containing a small amount of non-saponifying substances are the primary source of energy and carcass fat contains about 80–85% triglycerides,5–10% moisture and about 10% connective tissue. (Fat tissue does not express fat because fat does not contain water or connective tissue),**(Kashash ,2018)**.

Materials and methods

The study was conducted in the laboratories of the collage of Agriculture of the University of Tikrit in the period between 2021-2022 during which samples of chicken meat were collected, the fat of the sheep fat tail tissues, the fat of the sheep's belly, the fat of the calf hump, the fat of the calf belly from the local markets of the city of Tikrit, the fat of the camel hump and the fat of the belly of the camel from the province of Muthanna the city of Samawa They were well packaged with placed in clean plastic containers and frozen to -18 C for 72 hours until they were transferred to university.

The use of chicken breast meat samples after carrots and cleaning it directly in the preparation of burger pieces and the burger was manufactured according to the following method:

1- Cut the meat and fat into small pieces with a knife to prepare them for the chopping process

2- The meat was chopped with 10% of the fatty tissue added to each treatment by means of an electric chopping machine of Chinese origin GOSONIC type and then mixed well

3- Add salt, black pepper and garlic: so that 5 g salt was added, 5 g black pepper, and 5 g mashed garlic per kg of meat and fat and then re-chopped again to ensure homogeneity.

4- Forming pieces of the mixture by 50 grams to manufacture burger pieces.

Manufacture of burger pieces by means of a special mold after adjusting the thickness and diameter of the manufactured burger pieces and then wrapping them with butter paper and freezing them at a temperature of -18 ° C until subsequent checks.

1- Determination of free fatty acids:

Free fatty acids were calculated according to the method mentioned in **A.O.A.C. (2004).**

Using the following equation:

$$\text{Free fatty acids (\%)} = \frac{\text{amount of NaOH used in liquefaction(ml)} \times 2.082}{\text{Sample weight}}$$

The amount of free fatty acids calculated is represented by oleic acid (where 1 ml of 0.1 standard of base = 0.0282 g of oleic acid) is usually represented by 1 ml of 0.0282 grams of oleic acid, and in all cases the acid value is equal to twice as much as the fatty acids.

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2- Determination of pH:

The method mentioned before **(Nafiseh** and **Hossein, 2015)** was followed by a weight of 3 g of burger and mixed well with 10 ml of distilled water in a ceramic mortar and a pH pot using a pH device. meter .

3. Water holding determination

followed the method mentioned by **Price and Schweighet (1971)** by taking a tuned weight from the burger samples by 1 Gm on a piece of nylon the weight information because it does not have the ability to absorb water, then the sample is surrounded by nylon from both sides and then placed inside the filter sheet of the weight information and placed between two plates of glass and then pressed with a weight of 1 kg and left like this for 15 minutes and then weighed the filter paper and calculated the bound water according to the following equation: -

% for bound water = % for original humidity - % for free water in the sample (black,2000)).

Free Water Quantity = Weight of Filtration Sheet After Pressure (Wet) – Weight of Filtration Paper Before Pressure (Dry) = (Nylon Weight + Sample Before Pressure)- (Nylon Weight + Sample After Compression)

4. Determination of triglycerides

The standard solutions processed by Biolabo and according to the information proposed by the manufacturer, the method was modified with Lipid Clearing Factor (GPO-PAP), by taking samples from the burger up to (0.5) g and the samples were well crushed with a ceramic mortar and mixed with 3 A millimeter of distilled water, and used a centrifuge at a speed of 3000 cycles / minute for 15 minutes in order to obtain samples in a solution, and transactions were made on them according to the following table and with repeaters for each model

Assey	**Standard**	**Blank**	
1 ml	1 ml	1ml	Reagent
---	---	10 ml	Demineralised
---	10 mml	---	Standard
10 mml	---	---	Specimen

The additions were made as mentioned in the table above and the absorption was read using an APEL type Spectrophotometer and along a wavelength (500 NM) after incubation for 5 minutes at a temperature of (37).) Celsius degree and according to what is indicated in the method of work of the French company (Biolabo), and the triglycerides were estimated according to the following equation:

Amount of triglycerides = sample absorption / standard sample absorption x n

where n = 200 mg/dL

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5 - Determination of cholesterol

The standard solutions processed by Biolabo were used and according to the information proposed by the manufacturer, the method, Enzymatatic Colorimetric test (CHOD-PAP) was modified by taking samples from the burger up to (0.5)) Gm and the samples were crushed well with a ceramic mortar and mixed with 3 ml distilled water, and used a centrifuge at a speed of 3000 cycles / min for 15 minutes in order to obtain the samples in a solution form, and transactions were made on them according to the following table and repeaters for each model

Assey	**Standard**	**Blank**	
1 ml	1 ml	1ml	Reagent
---	---	10 ml	Demineralised
---	10 mml	---	Standard
10 mml	---	---	Specimen

The additions were made as mentioned in the table above and the absorption was read using an APEL type Spectrophotometer and along a wavelength (500 NM) after incubation for 5 minutes at a temperature of (37).) degree Celsius and according to what is indicated in the method of work of the French company (Biolabo), and cholesterol was estimated according to the following equation: -

Cholesterol amount = Sample Absorption / Standard Sample Absorption x N

N = 200 mg/dL

6- Determination of the Iodine Number Value

Determination the iodine number of the burger samples according to the method mentioned by **(A.O.A.C., 2004)** by weighing 0.25 g of oil and dissolve them in 10 ml of chlorform and add 30 ml of Hans solution and cover the beaker and shake well in the dark for 30 minutes and then add 10 ml of 15% solution potassium iodide and mix the contents well and then add 100 ml distilled water and standard with sodium thieusulfate solution 0.1 N in the presence of starch guide and repeated the same steps Without adding oil to the plank estimate. According to the iodine number according to the following equation:

Iodic number = B_A / Sample weight × standard N×12.69

B = number of sodium thiothelfate milliliters in planck

A = number of sodium thieusulfate mls in the sample

N = Normality

7 – Determination of the peroxide value

The method mentioned by AOAC., 2008 was followed by a weight of 5 (g) of the burger sample placed in a volumetric flask and 30 (ml) of a solution of acetic acid-chloroform was added and the decanter was shaken to dissolve the fat in solvents. Added 0.5 (ml) of saturated potassium iodide solution and shaken to allow it to homogenize then 30 (ml) of distilled water and 5 drops of starch solution were added as a reagent, then it was titration with a solution of sodium thyosulfate of 0. 1 N . The decanter

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was strongly shaken during lubrication to extract iodine from the chloroform layer. The appearance of purple color is evidence of the end of the process of liquefaction . A sample-free model was made of only solvents as a control model (Planck). The value of the peroxide (meq/1000g) was calculated according to the following equation

Peroxide value =] (A – B) * M * [1000 / W

A = the volume consumed during the lubrication of the model.

B = the volume consumed during the lubrication of the control model.

M = sodium thyosylfate molarity (0. 1 standard).

W = sample weight (g).

8- Determination of the melting point of fats

The melting point of the fat was determination according to the method used in the A.O.A.C. numbered 1.49.,4

9- Change in diameter of the ponder tablets during cooking:

The diameter of the tablets for each transaction was measured by three readings per tablet before and after cooking using the Vernia device and calculated the percentage of change in diameter due to cooking based on the following equation

$$\%\ \text{Change in diameter} = \frac{\text{diameter before cooking (mm)} - \text{diameter after cooking}}{\text{Diameter before cooking (mm}} * 100$$

10- Change in thickness of the ponder tablets during cooking:

The percentage of change in the thickness of the perker tablets was measured as a result of cooking based on the method (Judge, 1974) where the thickness was measured before and after cooking using the vernier device and calculated the percentage of change in thickness due to cooking based on the following equation:

$$\%\text{change in thickness} = \text{Thickness before cooking (mm) - thickness after cooking (mm)} / \text{thickness before cooking (mm)} * 100$$

11- **Total weight loss during cooking**:

Total weight loss during cooking was measured on three tablets of each treatment based on the following equation

$$\text{Loss Percentage} = \frac{\text{Weight before cooking (gm) - Weight after cooking (gm)}}{\text{Weight before cooking (gm)}} \times 100$$

12. Panel taste:

The characteristics and tables suggested by Lawrie, 2006 were used. The quality characteristics were studied by conducting organoleptic taste tests by selecting two assessors for the manufactured product

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from teachers and graduate students at Tikrit University / College of Agriculture / Department of Food Sciences), and up to 10 assessors to conduct the panel taste sensory assessment process. For all transactions, the degrees of texture, tenderness, juiciness, aroma, color and general acceptance were estimated according to the degrees indicated in the attached sensory evaluation form, which shows the degrees of sensory evaluation sensory analysis.

Un acceptable 5 marks	Acceptable 6 marks	**Good 7 marks**	**Verygood8 marks**	**Excellent 9 marks**

Give the appropriate estimate for the following characteristics according to the above Lawrie, 2006) Sensory Evaluation form

Notes	Adjective						the sample sequence
	General acceptance	Tenderness	Aroma	Juiciness	Flavor	the color	
							A
							B
							C
							D
							E
							F

13. Statical Analysis

The experiment was designed using a fully randomized design (CRD) test by Al-Rawi and Khalaf Allah (2000) and the results were statistically analyzed using the analysis of variance (ANOVA) design Probability P0< 0.05 and 0.01.

Results and discussion

1- Percentage of free fatty acids

Table(1) shows the effect of freezing on the ratio of free fatty acids to chicken breast meat burger manufactured with different fatty tissues

Type of meat	Type of fat	Fat site	Period			
			0 Day	15 Day	30 Day	45 Day
Chicken breast meat	Sheep	Sheep fat tail tissues	0.41B	0.44Ba	0.44Ba	0.46Ba
		Sheep belly	0.53Aa	0.53Aa	0.53Aa	0.53Aa
	Calf	Hump	0.105Ea	0.107Ea	0.106Ea	0.108Ea
		Calf belly	0.312Ca	0.312Ca	0.313 Ca	0.314Ca
	Camel	Hump	0.206Da	0.21Da	0.213Da	0.214Da
		Camel belly	0.124Ea	0.128Ea	0.128Ea	0.129Ea

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The results in Table (1) indicate that the fatty acids of chicken burger added to it are different fatty tissues, as the results indicate the variation in the percentage of fatty acids, which amounted to (0.41-0.46) % in the chicken burger added to it the tissues of the fat of the sheep fat tail tissues and the fat of the sheep's belly respectively, and ranged between (0.105-0.312% for hump and belly lard for calf , as it amounted to (0.26-0.214) % in fresh chicken meat burger added to the camel hump and stored by freezing at 18- m for 45 days, while ranging from (0.124 - 0.129) % meat in chicken breast meat burger and added to it camel belly fat respectively.

These results are similar to those of al- **Issawi and Naji, 2016**, when adding tomato residues extract to the burger, percentage of fatty acids (0.18-0.2) mg of manoldehyde for fresh samples and (0.190.215) mg Manoldehyde / 100 g after storage for a period of three weeks.

2- determination of the pH

Table (2): Shows the pH value of the burger prepared from chicken meat with different fatty tissues

Type of meat	Type of fat	Fat site	Period			
			0 Day	15 Day	30 Day	45 Day
Chicken breast meat	Sheep	Sheep fat tail tissues	7.9 Aa	5.8 Ac	6.8 Ab	5.4 Bd
		Sheep belly	7.4 Ba	5.7 Ac	6.9 Ab	5.5 Bc
	Calf	Hump	7.5 Ba	5.7 Ac	6.9 Ab	5.6 Bc
		Calf belly	7.2 Ba	5.9 Ac	6.8 Ab	5.7 Bc
	Camel	Hump	6.8 Ca	5.9 Ab	6.7 Aa	6.5 Aa
		Camel belly	6.2 Db	5.8 Ac	6.8 Aa	6.4 Ab

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The results of table (2) show the pH value of the burger prepared from chicken meat and added to it different fatty tissues that significantly exceed the chicken burger to which the sheep fat tail tissues is added p0>0.5 (7.85) compared to other species at the beginning of manufacturing. However, a gradual decrease in the pH value of the burger samples prepared from chicken meat and added to them is observed, the fat tail tissues and the belly fat of the sheep, the calf hump and the lard of the calf's belly. While the samples of the burger were preserved Added to it hump fat and camel belly, as it was not affected by the storage periods frozen at - 18 ° C for 45 days and this may be due to the stability of the

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fat of the hump and belly of the camel for the factors of decomposition as most research indicates that it contains a high percentage of saturated fatty acids compared to other animals where the percentage of saturated fatty acids reaches 64.4 of them 31.5 C16:0 , and25.5 C18:0 . **Sahraoui et al., 2015.**

3- **Percentage of bound water**

Table (3) shows the percentage of water associated with the broker product prepared from chicken breast meat with different fatty tissues

Period				Fat site	Type of fat	Type of meat
45Day	30Day	15 Day	15 Day			45 Day
66.9	66.8	67.0	71.24	Sheep fat tail tissues	Sheep	
69.5	70.5	70.4	68.8	Sheep belly		
67.2	69.2	69.2	68.8	Hump	Calf	
66.3	67.5	68.2	70.4	Calf belly		
68.3	68.3	67.4	67.6	Hump	Camel	
65.4	66.4	68.3	67.0	Camel belly		

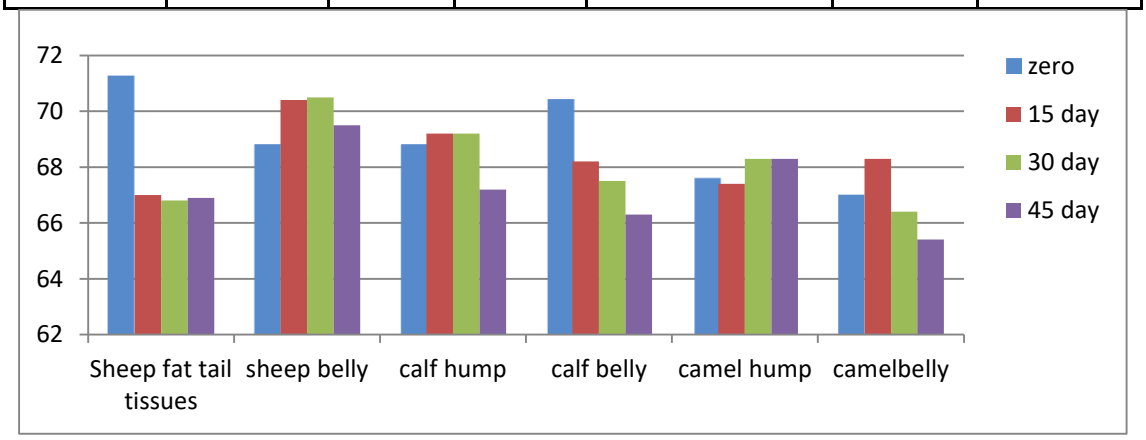

Figure 1 shows the percentage of water associated with the burger prepared from chicken breast meat with different fatty tissues

It is noted in Figure (1) that the burger prepared from the meat of the chicken breast added to it by the fat tail tissues of sheep and camel hump reached the percentage of water bound with it 71.24 and 67.0 % respectively, while in the burger added to it the fat of the sheep's belly and the lard of the belly of the camel reached a percentage of (67.0 , 68.8))% respectively and showed the prepared burger from the addition of hump and calf belly fat (68.8 ,70.4)%. This may be due to the difference in the emulsification of fat with water in processed products according to the type of fat, as we note that there is a role for phospholipids and their proportion in fats in improving the quality of retention of a high percentage of water bound with their ability to emulsify fat and water in processed products, where **Mirgani, 1977** pointed out that the low percentage of phospholipids in camel hump fat.

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4. Determination of triglycerides

Table (4) shows the ratio of triglycerides to chicken burger samples with different fat tissues

Triglycerides mg/dl	Samples
372	Sheep fat tail tissues
180	Sheep's belly fat
104	Calf hump fat
142	Calf belly fat
174	Camel hump fat
158	Camel belly fat

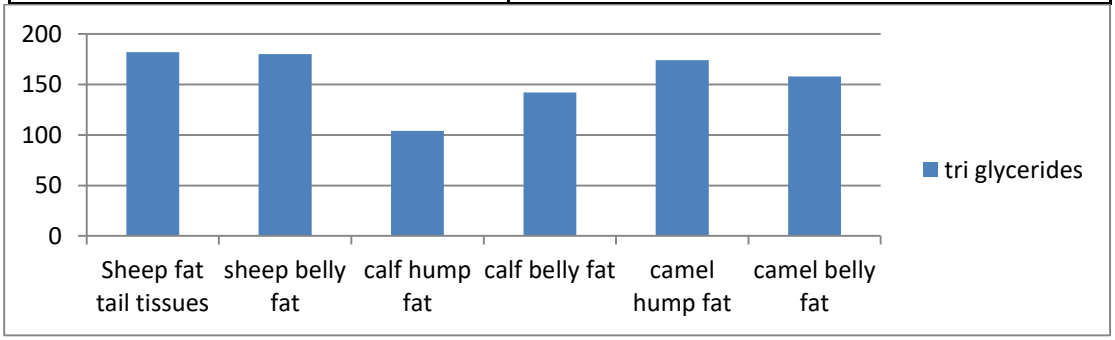

Figure (2) shows the level of tri glycerides of chicken meat burgers with different fatty tissues

The results of Figure (2) of the burger prepared from chicken breast meat and added to it different fatty tissues are automated, sheep belly fat, hump, calf belly fat, hump and camel belly fat, where the percentage of triglycerides (158,174,142,104,180,182) mg/dL respectively.

5- Determination of cholesterol

Table (5) shows the ratio of cholesterol to chicken burger samples with different fat tissues

mg/dL cholesterol	Samples
77.4	Sheep fat tail tissues
55.4	Sheep's bellyfat
44.0	Calf hump fat
52.8	Calf belly fat
30.8	Camel hump fat
49.6	Camel belly fat

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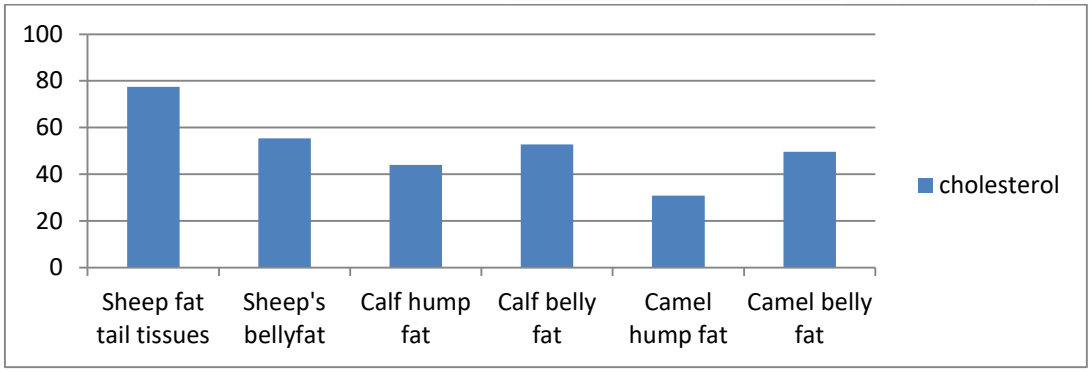

Figure 3 shows the cholesterol ratio of the burger prepared from chicken breast meat with different fatty tissues

It is noted from Figure (3) the level of cholesterol in the samples of the burger prepared from chicken breast meat is a decrease in the level of cholesterol to a large degree of camel hump fat and camel belly fat (49.6,30.8) mg / dL and these results converge with what **Mohamad 2019** as their results showed that camel meat contains cholesterol 51.56 mg/100 g while beef 74.5 mg/100 g.

6- Determination the value of the iodine number

Table (6) shows the iodine number of chicken meat burger samples with different fat tissues

The value of the iodine number	Samples
28.93	**Sheep fat tail tissues**
35.53	**Sheep's belly fat**
4.06	**Calf hump fat**
15.22	**Calf belly fat**
26.90	**Camel hump fat**
25.38	**Camel belly fat**

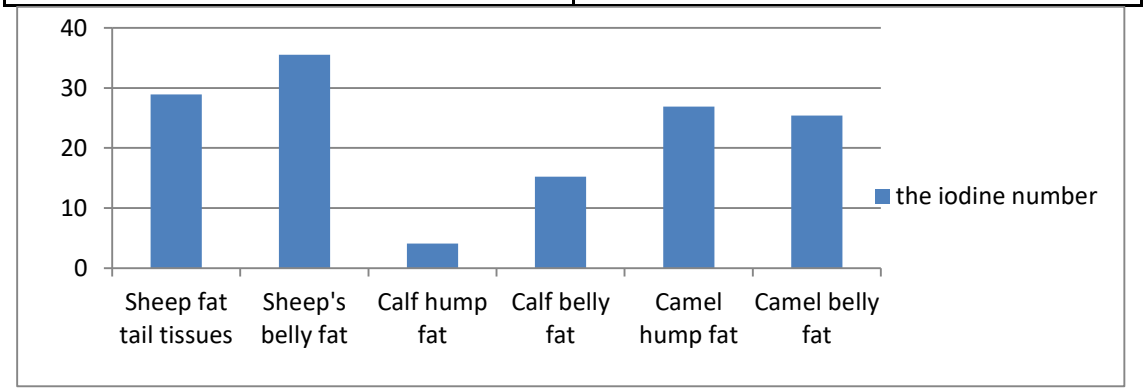

Figure (4) shows the iodine number of the ponder prepared from chicken breast meat with different fatty tissues

The results of Figure (4) show that the value of the iodine number was high in the chicken breast meat burger and added to it sheep belly fat to reach 35.53, while these values showed low indicators

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significantly P0<0.5 in the chicken burger added to calf hump fat and calf belly fat. In a study by **Lowrie 2006**, where we note that the values of the iodine number in chickens 80.67 and cows 52.33 and camels 46.43, as the iodine number index is evidence of the stability of fats and products against oxidative stress and this interferes with the activity of enzymes to decompose adipose tissues and produce free fatty acids and oxidize unsaturated acids in them with the help of light, oxygen, heat and storage conditions.

7- Determination the value of the peroxide number

Table (7) showing the value of the peroxide number of a chicken burger with different fatty tissues:

Peroxide number	Samples
20 c	Sheep fat tail tissues
25 b	Sheep's belly fat
40 a	Calf hump fat
20 c	Calf belly fat
25 b	Camel hump fat
25 b	Camel belly fat

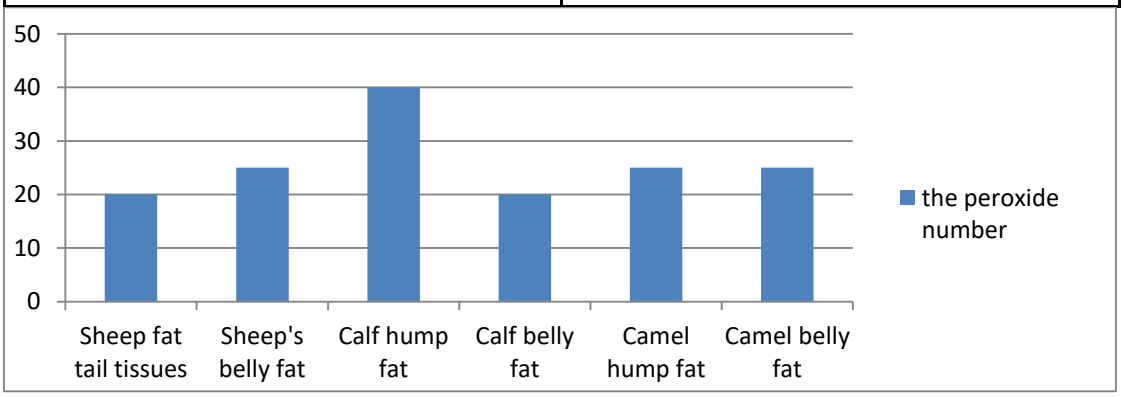

Figure (5) showing the value of the peroxide number of a chicken burger with different fatty tissues

The results of Figure (5) show that the samples of chicken burgers added to calf hump fat significantly exceeded the peroxide number at p0 > 0.05, while the samples added to the fat tail tissues and fat of the sheep's belly (20, 25) showed respectively This difference is due to the nature and ratio of saturated to unsaturated fatty acids in the added adipose tissue as unsaturated fatty acids are more susceptible to oxidation than saturated fatty acids. These results converged with the findings of **Baba et al. (2021)** with peroxide value between (11.86 – 20.88) for chicken coated and frozen for 4 Months at –18 °C.

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8- melting point of fats

Table (8) showing the melting point of chicken meat burger fat with different fatty tissues:

Melting point C		Samples
Period 45 Day	**Period zero Day**	
40	**40.5**	**Sheep fat tail tissues**
40	**40**	**Sheep's belly fat**
45	**45**	**Calf humpfat**
45	**45**	**Calf belly fat**
40	**40**	**Camel hump fat**
38	**38**	**Camel belly fat**

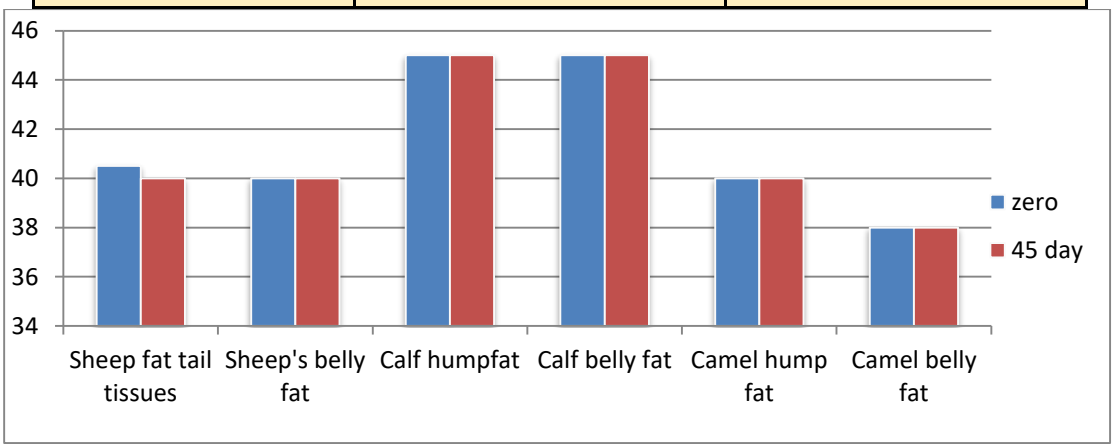

Figure (6) shows the melting point of chicken burger fat prepared from different fatty tissues

Figure (4-14) shows that the chicken burger added to hump and calf belly fats significantly outperformed the rest of the samples, recording (45,45) at p0 > 0.5, while the melting point of chicken burger fat added to it was Sheep fat tail tissues fat, sheep belly fat, camel hump and camel belly fat (38,40,40,40,40 respectively. 50-45C and the melting point of fat may be due to the quality of fatty acids. Loric 45, Myerstic 55, Palmetic 63, Styarique 69, Argydec 76. While melting point C16:1 balmtoaolic 0 Celsius, Olyk 13 Celsius.**(Morsch,2019)**.

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9- **Change in diameter of the burger pieces during cooking**

Table (9) showing the percentage of loss in diameter chicken burgers with different fatty tissues

Type of meat	Type of fat	Fat site	diameter before cooking	Period			
				0 Day	15 Day	30 Day	45 Day
Chicken breast meat	Sheep	Sheep fat tail tissues	11 b	18.7 Ca	18.1 Da	19.0 Ca	18.1 Da
		Sheep belly	11 b	25.7 Ba	26.9 Ba	25.4 Ba	26.3 Ba
	Calf	Hump	11 b	17.5 Ca	18.7 Da	17.8 Ca	18.1 Da
		Calf belly	11 b	17.8 Ca	17.8 Da	19.0 Ca	17.8 Da
	Camel	Hump	11 b	24.2 Ba	23.9 Ca	24.2 Ba	23.6 Ca
		Camel belly	11 b	35.4 Aa	34.5 Aa	33.3 Aa	35.1 Aa

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The results of Table (9) indicate the percentage of loss in diameter of the burger prepared from chicken breast meat ranges between (17.5 -35.4) % in the chicken breast burger added to it hump fat and camel belly fat respectively. We note that the samples that were low in loss in thickness were the highest in the decrease in diameter.

10- Change in thickness of the burger pieces during cooking

Table (10) shows the loss in chicken meat burger thickness with different fatty tissues

Type of meat	Type of fat	Fat site	thickness before cooking	Period			
				0 Day	15 Day	30 Day	45 Day
Chicken breast meat	Sheep	Sheep fat tail tissues	7.7a	28.9 Aa	28.0 Aa	28.5 Aa	28.3 Aa
		Sheep belly	7.7d	9.0 Dab	8.6 Eb	10.7 Da	10.8 Da
	Calf	Hump	7.7d	15.1 Ca	14.6 Da	**14.6** Ca	16.8 Ca
		Calf belly	7.7a	15.1 Ca	14.6 Da	**15.9** Ca	15.5 Ca
	Camel	Hump	7.7d	15.9 Ca	17.2 Ca	15.9 Ca	16.8 Ca
		Camel belly	7.7b	25.5 Ba	25.0 Ba	24.6 Ba	25.5 Ba

Small letters that are similar horizontally mean that there are no significant differences between them capital letters that are similar vertically mean that there are no significant differences between them

The results of Table (10) show the changes in thickness the burger prepared from chicken breast meat. The burger prepared from chicken breast meat and Sheep fat tail tissues showed a significantly high percentage of loss in thickness at po >0.05, ranging between (28, 28.9) % and in general that most of

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the loss rates in thickness were high and this may be due to the fact that the rapid poultry farming industry produced coarse fiber meat products called Woody chest Reducing its good physical qualities in water musk, hardness and roughness Romero et al. (2014)).

11- Change in weight of the burger pieces during cooking

Table (11) shows the percentage of loss in the weight of chicken burger with different fatty tissues:

Type of meat	Type of fat	Fat site	Weight before Cooking	Period			
				0 Day	15 Day	30 Day	45 Day
Chicken breast meat	Sheep	Sheep fat tail tissues	50 b	40.53Ba	40.37Ba	40.73Ba	41.17Ba
		Sheep belly	50 b	46.73Aa	**46.73**Aa	**46.8**Aa	47.17Aa
	Calf	Hump	50 b	31.87Ca	31.87Ca	31.87Ca	32.20Ca
		Calf belly	50 b	41.93Ba	41.93Ba	41.93Ba	42.80Ba
	Camel	Hump	50 b	39.57Ba	39.60Ba	39.93Ba	39.80Ba
		Camel belly	50c	39.37Ba	39.33Ba	39.37Ba	39.80Ba

Small letters that are similar horizontally mean that there are no significant differences between them capital letters that are similar vertically mean that there are no significant differences between them

The results of Table (11) indicate that the burger prepared from chicken breast meat and added to it have different fatty tissues. It showed an increase in the percentage of weight loss ranging from (32.2)% in the burger added to it the fat of the calf hump, while it reached (47.17)% in the chicken burger added to the sheep's belly fat, which contains a percentage of saturated fatty acids up to 43% resists high temperatures during cooking and reaches a melting point of 90 °C, but the texture of the meat of the rapidly growing chicken breast has shown problems with the type of tissue that is unwanted Woody breast. **Vonstaden et al. 2019**

12- The effect of adding fat tissue to the chicken burger on the qualitative and sensory qualities:

1- The effect of adding fat tissue on the color trait in chicken burger

Table (12) shows the sensory assessment (color) of chicken burgers manufactured with different fatty tissues

Color				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
8.7 A	9	9	8	Sheep fat tail tissues	sheep	Chicken breast meat
8.7 A	9	8	9	Sheep belly		
9.0 A	9	9	9	Hump	Calf	
8.7 A	8	9	9	Calf belly		
9.0 A	9	9	9	Hump	camel	
9.0 A	9	9	9	Camel belly		

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Capital letters that are similar vertically mean that there are no significant differences between them

Table (12) shows the results of the color trait of the chicken breast meat burger prepared with different fatty tissues where there are no significant differences between the coefficients in the color characteristic.

2- The effect of adding fat tissue on the flavoring characteristic of chicken burger:

Table (13) showing the sensory assessment (flavor) of chicken burger manufactured with different fatty tissues

Flavor				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
9.0 A	9	9	9	Sheep fat tail tissues	Sheep	Chicken breast meat
9.0 A	9	9	9	Sheep belly		
9.0 A	9	9	9	Hump	Calf	
9.0 A	9	9	9	Calf belly		
8.3 B	8	8	9	Hump	Camel	
8.7 AB	8	9	9	Camel belly		

Capital letters that are similar vertically mean that there are no significant differences between them

Table(13) of the flavor trait also shows that there is a significant decrease of 0.05 > Po in flavor in the chicken burger added to the camel hump (8.3).

3- The effect of adding fat tissue on the juiciness characteristic in chicken burgers

Table (14) shows the sensory (juiciness) assessment of chicken burger manufactured with different fatty tissues

Juiciness				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
8.3 A	8	8	9	Sheep fat tail tissues	sheep	Chicken breast meat
7.3 C	7	7	8	Sheep belly		
7.7 B	7	7	9	Hump	Calf	
8.3 A	8	8	9	Calf belly		
7.7 B	7	7	9	Hump	camel	
8.3 A	8	8	9	Camel belly		

Capital letters that are similar vertically mean that there are no significant differences between them

The results of Table (14) of the juiciness trait also show a significant superiority of 0.05<Po for chicken burgers (8.3,8.3,8.3) added to Sheep fat tail tissues, calf belly fat and camel belly fat respectively.

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4- The effect of adding fat tissue on the aroma characteristic in chicken burger:

Table (15) showing the sensory evaluation (aroma) of chicken burger manufactured with different fatty tissues

Aroma				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
9.0 A	9	9	9	Sheep fat tail tissues	sheep	Chicken breast meat
9.0 A	9	9	9	Sheep belly		
8.7AB	9	9	8	Hump	Calf	
9.0 A	9	9	9	Calf belly		
8.3 B	8	8	9	Hump	camel	
8.7 AB	8	9	9	Camel belly		

Capital letters that are similar vertically mean that there are no significant differences between them

Table (15) of the aroma trait shows that there are no significant differences in the aroma characteristic except for the chicken burger to which the camel hump is added, where it obtained (8.3) out of (9).

5 - The effect of adding fat tissue on the tenderness of chicken burgers:

Table (16) shows the sensory assessment (tenderness) of chicken burger manufactured with different fatty tissues

Tenderness				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
7.3 BC	7	7	8	Sheep fat tail tissues	sheep	Chicken breast meat
7.0 C	7	7	7	Sheep belly		
8.0 A	9	8	7	Hump	Calf	
8.0 A	9	7	8	Calf belly		
7.7 AB	7	9	7	Hump	camel	
7.7 AB	7	9	7	Camel belly		

Capital letters that are similar vertically mean that there are no significant differences between them

The results of Table (16) of the tenderness trait show that the samples of the chicken burger significantly exceed 0.05<P0 (8.0-7.7) containing calf fat and camel fat respectively.

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6- The effect of adding fat tissue on the general acceptance trait in chicken ponds:

Table (17) shows the sensory assessment (general acceptance) of chicken ponders manufactured with different fatty tissues

General acceptance				Fat site	Type of fat	Type of meat
The average	M3	M2	M1			
8.7 A	9	9	8	Sheep fat tail tissues	sheep	Chicken breast meat
8.3 B	8	9	8	Sheep belly		
9.0 A	9	9	9	Hump	Calf	
8.3 B	8	9	8	Calf belly		
8.3 B	8	9	8	Hump	Camel	
8.7 A	9	9	8	Camel belly		

Capital letters that are similar vertically mean that there are no significant differences between them

The results of Table (17) of the **general acceptance** trait show that the samples of chicken meat burgers significantly outweigh 0.05< p0 added to **Sheep** fat tail tissues (8.7), calf hump (9.0) and camel belly fat (8.7) (8.7) Compared to other transactions (8.3,8.3,8.3) sheep's belly, calf belly and camel hump out of (9) degrees

Conclusions

Burger samples added to camel belly fat, camel hump and calf hump showed low levels of free fatty acids, The sensory evaluation scores were good (7) and excellent (9) for most of the traits. The melting point of burger fat varies between (38) C, which is close to the temperature of the human body and is ideal for palatability and has a soft, greasy feel. As for its height to (45) C, it makes it feeling of a solid greasy feel

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