

STUDY SOME PHYSICAL AND CHEMICAL PROPERTIES OF SOME CERTAIN TYPES OF MEATS AND THE EFFECT OF FREEZING ON IT'S

Khadeeja S. J. Al-Husseiny

Department of Food Science , Collage of Agriculture, University of Basrah,
Basrah, Iraq

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ABSTRACT

The present study aimed to study the chemical composition and physical characteristics of fresh and frozen meat taken from the different types of animals (cattle, sheep, chicken and fish).

Chemical composition (moisture, protein, fat and ash) estimated for the fresh and frozen samples. After that, mixing of fresh and frozen samples of meat with salt solutions at concentrations (0, 1, 3, 5) %, then the pH value was recorded, Also water holding capacity was measured for these meats.

In conclusion, there are differences between the types of red and white meat in the chemical composition, and the different concentrations of the salt effect the pH values and water holding capacity of samples of fresh and frozen red and white meat.

Statistical data found significantly different at the level of ($P \leq 0.01$) by effect of type of meat on the percentage of chemical composition, pH and water holding capacity values, Where type of treatment was effected significantly on percentage of moisture and water holding capacity values only, Also interferences between type of meat and type of treatment was significant on water holding capacity values. Also interferences between the type of meat and concentrations of brine and tri-



interferences among tree factors effected significantly on water holding capacity values, But it has not effect on pH values ,In the other hand interferences between type of treatment and concentrations of brine was not significant on all of these factors.

INTRODUCTION

Meat was those animal tissues that can be used as food or the represents animal tissue that bio basic changes occurred after the death of the animal and became suitable for consumption as food and is obtained from farm animals (cattle, sheep, goats, camels and chickens) (1),in addition to poultry and fish ,meat products considered high nutritional value because they contain high protein, mineral elements, group B vitamins, vitamins soluble in fat, and many of the biological activities within the body and processes non-volitional need to essential amino acids to sustain life, which is the meat most important sources(2).

Several factors affected in the chemical and physical properties of the meats as the type, size, sex and physiological status as well as sexual maturity and nutrition.

pH is one of the important factors that give a good indicator of quality in determining the length of time for the storage of meat and that his way can evaluated the quality of the meat, it is also the applicability of meat to carry the water and the amount of streaming fluid when dissolving the samples. The most important factors affecting on the pH in the meat after animal slaughter is the decomposition of glycogen and combines lactic acid .the pH influenced by several factors, including treated the animal before slaughter, the strain of the animal before slaughter leads to



Most of glycogen consumption in the muscles before slaughter and therefore the pH become high.

(3) Has been found that the pH was 6.18 after about 4.5 hours of slaughter of animals and the color of muscle was dark red.

Also, high temperature degree after animal slaughter will lead to speed up of interactions drain energy of the animal slaughtered and thus lower pH after a short period (4), Also it was affected by the type of animal, (5)has been reported that the pH of the fresh meat fresh cow, buffalo, sheep and camel was (5.1 ,0.5 ,5.8, 5.6) respectively, with the similarity of storage conditions in the dorsal longitudinal muscle while the type of muscle don't effected on pH value. But pH influenced by storage in cooling and freezing (6)have been noted that pH in the fresh dorsal longitudinal muscle in cows was 6.4 and decreased to 5.4 when cooling it for 10 days and then the value dropped to 5.2 when freeze for 90 days at - 10 C°.

MATERIALS AND METHODS

Raw materials:

Red meat (cattle and sheep)andWhite meat (chicken and fish):

Study conducted to evaluate on cattle and sheep meat chemically and physically. Animal age about 1.5 years almost taken from the Round, which was obtained from the slaughter hours of Basra. the samples taken from (thigh muscle) and place in plastic containers, Also meat of chicken and fish and brought to the lab. meat technology - College of Agriculture / University of Basra, then minced meat using electrical chopper. The samples were prepared them for the test.



The chicken under study was aged (40) days, and take the meat samples after slaughter. The samples have been cut with a knife and took a thigh muscle and minced electrical chopper and mixed together.

Whereas fish take from river fish available in the city of Basra markets a carp normal (*Cyprinus carpio*). Fish samples were obtained after prior agreement with a vendor for supplied good quality. Then brought to the laboratory and kept in the ice, the samples were cleaned, and prepared them for the purpose of the test. Also, 500 gm of all meat types samples were frozen at -18° .

Brines

Salt solutions were prepared at concentrations (0,1,3,5)% using distilled water and salt Iranian-made of pure purity according to the standards of modern standard and controls 99.2%.

Chemical analysis:

All chemical analysis were made on double, and it were included that:

Moisture

It was estimated percentage of moisture accorden(7).

Protein

Total nitrogen ratio for all samples were tested based on the method described in the (7) and using Microkjeldahle method. Conversion coefficient of 6.25 was used to extract the protein to meat ratio of all samples.



Fat

Fat percentage was measured in all samples of meat according to the method described in the (7) using extraction units soxhlet (soxhelt extraction units) and the extraction process had lasted more than 18 hours using petroleum ether.

Ash

Ash content was estimated in meat samples using (Muffle furnace) type Cabolit eat 525 C° for 16 hours according to the method described in the (7).

Physical properties:

Estimate of pH:

The pH of the samples were determined according to (8) by taking 5 grams of chopped samples and added a 20 ml of distilled water mixed well using blender for 5 minutes after that filtration through cotton read using a pH (pH-meter) equipped with the company (TAFESA).

Water Holding Capacity (WHC):

10 grams of minced meat with 20 ml of distilled water were mixed well to get a homogeneous mixture using a blender and then transferred the contents to the graduated cylinder on the end of cylinder there was funnel and filtration paper number (1), and receiving filtered and recorded his size after prescription 30 minutes (9).

Statistical Analysis and Design

Complete Randomized Design(CRD) for two and three factors was used to analysed results accorded Special Program For Statistical System (SPSS) (10) and tested these factors choosing Rrvise-Least significant differences Rrvise- L.S.D. at the level of ($P \leq 0.01$).



RESULTS AND DISCUSSION

The chemical composition of meat:

Moisture

Table (1) showed that the chemical composition approximate for fresh and frozen beef samples, The moisture content amounted to 76.18% and 76.14%, respectively, This results agreed with the this results reported by(11) which the moisture content in skeletal muscle for cows in general up to 76%, and it is clear that the moisture content is within the limits (57-77.1%) mentioned by (12) in the muscles of fresh carcasses of cows.

This results also converge with the results by (13), who pointed out that the moisture content of 75% in various types of vertebrates such as fish, birds and cattle.(14) found that the moisture was 75.75% in the thigh of fresh calf, and 76.14% in fresh cow thigh meat which is high values, and this results of this researchers was consistent with the findings of the (15).

The percentage of moisture in the fresh and frozen sheep meat were (75.30 and 74.80)%, which is different from what was founded by (16) where the moisture content in meat from Al-Auaseewe was 75.80% and it decreased to 75.78%. (17) noted that the percentage of moisture in lambs meat lambs aged 3 months was 72.90%, while at the age of 10 months, reaching to 73.20%. It is higher than the percentage obtained by (18) as indicated that the percentage of moisture in the sheep was 72%.

For the fresh and frozen chicken meat the percentage of moisture was 65.60% and 67.50% respectively, This results was higher than that reported by the (19)who found that the chest of fresh chicken meat has a moisture of 65.82% in the fresh samples. (20) Reported that the percentage of moisture in the chicken meat thigh and chest of



73 weeks age was 68.84% and 70.78% respectively, and these ratios approach to the moisture content of chicken meat in the current study.

In fresh and frozen fish the moisture were (78.83 and 77.99) %respectively, The results obtained from this study were less than the results of other studies on fish, especially study (21) which showed that the percentage of moisture in the carps were 80.94% and (22), which showed the moisture ratios in fish carp was 78.45%, while (23) found that the ratio was 75.98%, (24) explained that the moisture content was 78.8%.

The differences in the results between the current study and other studies may be to the animal nutrition, species and the portion taken from the carcass.

Protein

Table (1) showed the percentage of protein in various meat, for the fresh and frozen beef, the proportion of protein in the convergent meat samples were 19.67% and 19.65% respectively, This results were consistent with the results reported by (14) who indicated that the proportion of protein in the thigh meat fresh calf was 19.80% and decreased to 18.76% in the freezer thigh meat. This decreased might be due to the decomposition of meat proteins in very small amounts and slow (1). This percentage has been agreed with (15) who mentioned that there is no significant difference to the impact of animal age in the percentage of protein in meat calves and cows which the ratio was 24.80% and 23.20% respectively. This percentage was lower than the percentage found by (5) as it indicated that the fresh meat taken from the thigh of the cow with a protein of about 23.19%, as well as less than the percentage noted by (23) when studying the percentage of protein in the three breeds of bulls aged 10 month,



the percentages were 24% , 24.9% and 24.5% respectively, but higher than the percentage found by (24)when studying the chemical composition of the flesh of the thigh muscle of cows (6 years old) as the protein ratio was 18.80% .

In the fresh and frozen sheep meat the protein percentage were 20.70% and 18.60%respectively, This result agreed with results reported by (15), who stated that the protein is not significantly affected and the protein percentage in lambs meat aged 3 months was 21.90%, while the protein percentage in lamb meat age of 10 months was 21.50%, This protein percentage was lower than the percentage obtained by (25) as showed that the percentage of protein in Najdi sheep (two weeks of age) was 22.8%, This percentage was higher than the percentage of protein in Al-Orabi sheep (two weeks of age)which was 18.7%.And protein percentage was 16.15% in Al -Orabi sheep (on month of age),These percentages were higher than the percentages reported by (26) who stated that the percentage of protein in raw lamb was 16.30%.

Either in fresh and frozen chicken meat, the protein percentage were (19.80 and 19.70) % and these values were the value found by (27) as stated that the percentage of protein in chicken meat was to 24%, However (28) reported that the protein percentage in chest and thigh of chicken were (13.18 and 12.80) % respectively. And It was less than the protein percentage 20.22%in the mixture of thigh and chest meat of fresh turkey (29). These protein percentage asymptotical to the percentage of protein which found by (18) in (thigh and chest)chicken meat after 24 hours of slaughter was (23.32 and 24.9) % respectively.(30) found that the percentage of protein in the chest fresh chicken was 23.30%, However(31) reported that the



percentage of protein in the muscle meat chicken chest after six hours of stiffness chocking was 20.50%.

In fresh and frozen fish meat, the protein percentage were 17.50% and 17.10% respectively, The results of this study were less than the results obtained from other studies on fish, especially study of (19) who reported that the percentage of protein in the carp fish was 8.42%,while (20) mentioned that percentage of protein in carp fish was 18.68%, and (21) found that the percentage was 17.52%. Also, (22) found that the protein percentage was 17.5%.

The differences in the percentages of protein in each of beef, lamb, chicken and fish meat may be due to inverse proportionality between the moisture and protein, when the moisture increased, the percentage of protein decreased. These differences also might be due to animal nutrition, strain type and the portion taken from the carcass (32).

(33) noted that the protein decreasing with increasing duration of storage and this decline might be due to change in the chemical composition ratios and crash protein and this decline was undesirable during long storage term because it caused a decrease in the nutritional value of different meat.

Fat;

Table (1) showed the percentage off at in the fresh and frozen meat, it was reaching to 3.30% in fresh beef while the percentage of fat in frozen beef was 3.27%. The results of this study are consistent to what (14), reported who found that where the percentage of fat were 3.66% and 3.57% in the thigh and calf of fresh cow meat, This variation in the percentage of fat was due to the different sex.



(34) Mentioned that the percentage of fat in muscle tissue to different beef ranging from 1-4.2%. This was confirmed by (15) as stated that the percentage of fat in the meat calves was 1.5% and in the meat of large cattle was 2.8% and this percentage is lower than the percentage found by (35) who indicated that the percentage of fat in beef was 1.27%.

The percentage of fat in fresh and frozen sheep meat were (3.80 and 4.10) %respectively, and this value approach to what (15) found who stated that the percentage of fat in the lamb meat age of 3 months and sheep aged 10 months were (4.0 and 4.7) %respectively, which is comparable to the percentage mentioned by (34) who reported that the percentage of fat in the different muscle tissue of sheep meat ranged between (3.4 to 3.8) %.

The percentage of fat in fresh and frozen chicken meat were(1.37 and 1.15) %respectively, This results was less than the percentage of fat in the chest and the thigh of the chicken which were (4.32 and10.09) % respectively, (35).However found that the fat and percentage in muscles of chicken was 3% (36), while(37) reported that the percentage of fat in the muscles of chicken was 1.2%.

The percentage of fat in fresh and frozen fish meat were (2.19 and 2.20) %respectively, The results of this study were lower than the results obtained from other studies on fish, especially study of (19) who found that the percentage of fat in carp fish was 5.616%,Also (20) reported that the percentage of fat in carp fish was 1.36%, While (21) found that the percentage of fat in carp fish was 4.96%,And (21) explained that the fat contenting carp fish was 2.90%.



Ash

The results for ash contenting to different meat showed that the percentage of ash reached to 0.86% for fresh beef and 0.87% for frozen meat. The results of the current study agreed with the results reported by (37) and (38) who have studied the ash content in sliced cow fat-free and those who have suggested the amount of ash in the meat of different species of animals was between (1- 0.8) %, but (39) was reported that the percentage of ash in beef ranged (3.5-5)%. This ash ratio was higher than the ratios of ash which found by (40) as showed that the percentage of ash in sliced veal fat after 6 hours of slaughter was 1.28%, but higher than the ratio found by (41), who stated that the percentage of ash in the red pure beef was 0.9%.

The percentage of ash in fresh and frozen sheep meat was (1.01 and 1.13) % respectively, other researcher found that the ash content in fresh and frozen goat meat which studied by (42), This researcher indicated that the percentage of ash was (1.03 and 1.06) % in goat meat aged 7 month and (1.2 and 1.3) % in goat meat aged 8 month, Also (1.6 and 1.7) % in goat meat aged 11 month.

The percentage of ash in fresh and frozen chicken meat was (1.00 and 2.10) % respectively, and these values were different than the ash content in the chest muscle meat and thigh chicken meat from (1.30 and 1.08) % respectively (43), which was comparable to the percentage obtained from (44) who pointed out that the percentage of ash in chicken meat was (1%), and this percentage was less than the ash content in chicken meat (1.24%) reported by (35).

The percentage of ash in fresh and frozen fish meat was (1.95 and 2.00) % respectively, The results of this study were less than the results of other studies on



fish, especially studied of (19) who found that the percentage of ash in carp fish was 0.962%, and (20) who reported that the ash content in carp fish was 1.55%, While (21) found that the percentage in carp fish was 1.32%. However (22) explained that the ash content in carp fish was 1.95%.

It was noted from this study that there were differences in chemical composition among different types of meat and when compare with other studies, largely due to the difference in the animal nutrition, species of animal and the portion taken from the carcass.

Table (1): the chemical composition of meat:

Type of meat	Type of treatment	Ingredients %			
		Moisture	Protein	Fat	Ash
Cows	Fresh	76.18	19.67	3.30	0.86
	Frozen	76.14	19.65	3.27	0.87
Sheep	Fresh	75.30	20.70	3.80	1.01
	Frozen	74.80	18.60	4.10	1.13
Chicken	Fresh	65.60	19.80	1.37	1.00
	Frozen	67.50	19.70	1.15	1.20
Fish	Fresh	78.83	17.50	2.91	1.95
	Frozen	77.99	17.1	2.20	2.20

- All results in the table is the rate of repeating.
- Revised- L.S.D. for effect of type of meat on moisture =2.25
- Revised- L.S.D. for effect of type of treatment on moisture =0.87
- Revised- L.S.D. forefeet of type of meat on protein =2.35
- Revised- L.S.D. forefeet of type of meat on fat =1.29
- Revised- L.S.D. forefeet of type of meat on ash =0.97

Statistical data pointed to the significant differences at the level of ($P \leq 0.01$) in the effect of type of meat on the percentage of moisture, protein, fat and ash, whereas type of treatment had significant effect on percentage of moisture only, Also introduction between type of meat and type of treatment was not significant on all of ingredients of these types of meat.



Physical properties of the meat:

pH

The pH value in fresh beef were (6,5.66, 5.52, 5.47) and frozen beef were (5.63, 5.47,5.40, 5.33) respectively, when mixed with saline solution 0%, 1%, 3% and 5% as shown in Table (2), The pH values of this study were agreed with the values pH obtained by (45) who noted that the fresh beef from the rib area has pH values ranged from 6.64 - 6.67, Also (5) indicated that the pH value was 5.71 in the thigh of beef. In addition, the pH values in the camel meat was 5.70 (46), while (43) found that the pH value of the pH was 5.6 ,Also these values were closed with the results recorded by (47) who showed that the pH value of beef was (6.5).

In fresh lamb meat pH values were (6.80,6.27, 5.86, 5.74) and in frozen sheep meat were (6.67, 6.09, 5.78, 5.60) respectively, when mixed with saline solution 0% , 1%, 3% and 5%, which approach with (48) study, who showed that the pH value of the male sheep Hamdani aged 7 months was 5.83. The results of the current study agreed with the results of (29), Who found that the pH value in fresh meat for male goat was 6.19 either in a female goat was 5.96, Also (49) reported that the pH value was 5.87 in the longitudinal dorsal fresh muscle for elderly male of Al-Awasi lamb. These values approach to what showed by (26) who found that the pH value in raw lamb was 5.25, In addition (29) stated that the pH value was 6.19 in the slaughtered goat and then dropped to 6.08 after three hours of slaughter.

The pH values in fresh and frozen chicken meat were (5.88, 5.70, 5.60, 5.50) and (5.75, 5.85, 5.86, 5.89) after mixing it with saline solution 0%, 1%, 3% and 5% respectively. (50) Reported that the pH value in a mixture of fresh thigh and chest turkey meat was 6.10 which is higher than the pH value of chicken meat under study. These values were approached to what showed by (51) who pointed that the pH value



was 5.80 and that pH value was not stable after slaughter and during storage. The pH value in the old chicken chest and thigh meat were 6.64 and 6.73 respectively (18). These values were approached to what found by (31) who stated that the pH of the muscles of the chicken was (5.96).

In fresh and frozen fish pH value ranged from (7.20 - 6.75) and (6.76 - 6.65) respectively, after mixing it with saline solution 0% ,1%, 3% and 5%, which is comparable to the pH values of Hockey fish which was (6.6 to 7.6) (52), And approached with the pH value (6.75) of the common carp fish (53), But this results was higher than the pH value of the carp fish and Alktan(6.4) and (6.3) respectively (54), As well as this results approached with pH value (6.5) of fresh grass carp fish studied by (21).

The pH values of the fish after fishing was ranging from 6.5-6.0, And fish was acceptable until the pH was 6.8, but it was damaged when pH access to 7 (55). However the pH value of fresh fish ranging from (6.2 to 6.8) and increased above that was indication of damage of fish (56).

(57) and(58) reported that the pH value was ranging from 6.8-7. The differences in the pH of the initial and final values in fish might be due to the factors relating to gender, season, level of nutrition, degree of stress, method of fishing, duration of storage and the level of primary glycogen (58).



Table (2) the pH value of the meat at a temperature of 16 C ° :

Type of meat	Type of treatment	The concentration of the brine%			
		0	1	3	5
Cows	Fresh	6.00	5.66	5.52	5.47
	Frozen	5.63	5.47	5.40	5.33
Sheep	Fresh	6.80	6.27	5.86	5.74
	Frozen	6.67	6.09	5.78	5.60
Chicken	Fresh	5.88	5.70	5.60	5.50
	Frozen	5.75	5.85	5.86	5.89
Fish	Fresh	7.20	7.30	6.79	6.75
	Frozen	6.76	6.70	6.68	6.65

- All results in the table is the rate of repeating.
- Revised- L.S.D. forefeet of type of meat=0.7

In general the pH of the different types of meat turned toward acidic and the reason for that goes back to the start of the free fatty acids by lipases and phospholipases which remain effective (59). It can be one of the reasons for the decline in the pH is to produce organic acids by bacteria (60). And that the variation of pH values might be due to the difference in carbohydrate ratios in the types of meat and thus lead to a variation in the amount consisting of lactic acid, which is responsible for the change in pH values and is the pH measure indirectly to the extent of decomposition in carbohydrates materials, particularly glycogen after death and turn it into lactic acid (55).

We also note that the pH values in meat were mixed, as a result of varying the proportion of nitrogenous bases formed as a result of the decomposition of protein, which varies in various samples from meat. It is known that these nitrogenous bases are responsible for the high pH values, and this is proven by (61).



(62) showed that decline in pH can be influenced by physiological status of the animal as well as on the state of hunger and muscular stress before slaughter or pH may rise to higher than normal limit and this is due to the depletion of glycogen.

Statistical analysis of the results proved that there was significant differences at the level of ($P \leq 0.01$) in the effect of type of meat on the pH values, whereas the rest factors were not significant.

Water Holding Ability (WHA)

Table (3) showed the WHA values for fresh and frozen beef preserved in different concentrations of salt(0 , 1,3 and 5)%, the results were (2.7, 3.5, 1.3 and 0.97) ml and (2.5, 4.0, 1.5 and 1.0) ml respectively, The water Holding capacity were (9.74 and 14.54) ml for raw cow meat at the natural and high pH respectively,(63). While (64) found that the WHA values of the beef radiator for different periods (0, 3, 6 and 9) months were (11.98, 11.24, 12.64 and 11.82) ml which is higher than WHA for the studied beef.

In fresh and frozen sheep meat, the WHA were (6.5, 5.5, 5.0 and 4.8) ml and (3.2, 5.9, 5.2 and 4.87) ml respectively, when preserved at a salt concentrations of (0,1,3 and 5)%. The WHA values was higher than that found by (65),Who pointed out that the WHA in pork after (1, 14 and 28) days of storage, were(3.10, 2.77 and 2.59) ml respectively, These values were higher than the WHA values (7.46 ml) for the fresh meat of small lambs after 24 hours of rigor mortis(66).

(67) reported that WHA for the lamb was (7.22 ml) at pH = 6.83, which was lower than the value reported in this study, An approached to the values of the WHA that mentioned, (68) studied the amount of water associated with the goat meat stored at 4 °C after two hours and after (3, 6 and 10) days, the results showed that the WHA were



(9.10, 9.64 and 9.88) ml respectively. It also an approached to the WHA value of goat meat in the aged of 2 and 6 months which were (7.32 and 7.75) ml respectively (69).

Either in fresh chicken meat, the WHA were (2.5, 4.0, 1.57 and 2.96) ml, while in frozen chicken meat, the WHA were (7.0, 6.5, 4.4 and 3.1) ml respectively, when it preserved at a salt concentrations of (0,1,3 and 5)%. This WHA was higher than the WHA-2.22 ml -in breast chicken aged of 40 days after the slaughter directly ,Also it was higher than WHA values(6.45 , 6.82 and 6.77) ml at cooling after (1, 4 and 7 days) of rigor mortis (65),but the present values lower than the results of (70) who indicated that the WHA values were(13.81 and 13.61) ml respectively, in the thigh and breast Turkish chicken meat ,and (13.75 and 13.56) ml respectively, in the breast and thigh Brazilian chicken meat and (13.95 and 13.97) ml respectively, in the breast and thigh of chicken (Dohuk).

In fresh and frozen fish meat, the WHA values were (9.8,14.7,9.5 and 8.5) ml and (12.5, 15.5,10.1 and 9.5) ml respectively, when it preserved at a salt concentrations of (0,1,3 and 5)%. These values were higher than the values found by (71) in Rohu fish (Indian carp) and frozen Mrigal as recorded approximately (8.55 and 8.39) ml of WHA respectively.

The WHA values were higher in frozen meat compared to non-frozen meat (72).

The decline in the viability of the water carrying mainly due to dehydration myofibrellar protein especially actin and myocin and that the cause of the dehydration protein is attributable to the size of the ice crystals and increase the ionic strength as a result of the crystallization of water and oxidation of fat and protein (73).

The viability of the water load in muscle tissue direct impact on the contraction that occurs in meat during storage when portability water load in the tissue is weak the amount of the lost moisture considerable weight during freeze storage, since



portability meat to carry the water goes down when it reaches the (pH) to (5.5), a tie-electric point Iso-electric point (pI) of myosin and move away pH value muscles for the equalizer electric point, the amount of associated water be high for the same muscles and animal (74), that the viability of the protein to carry the water means the interaction that gets between protein and water as a result of this interaction, the portion of water retained with the protein, and this property was importance on sensory properties of the ducks, geese and chickens meat (75).

The results in this study agreed with the results reported by (76) who found that the higher pH values were decreased WHA values for the concentrator protein prepared from chicken waste, this results as cribbed for the increased in pH values cursed increased the melting of the protein, which was the higher pH values reduces the hydrophobic activity of the proteins and increased it stability for holding water (12).

The differences in the WHA in the different meats due to the differences in the proportion of moisture, as there is a relationship between the moisture content in the muscles and the value of the pH (56).

There were significantly different at the level of ($P \leq 0.01$) by effect of type of meat, type of treatment and concentrations of brine, Also interferences between type of meat and type of treatment, interferences between the type of meat and concentrations of brine and tri- interferences among tree factors on water holding capacity values. But the interferences between type of treatment and concentrations of brine was not significant.



Table (3) the water holding capacity(WHC) of the meat after the hour and a half:

Type of meat	Type of treatment	The concentration of the brine%			
		0	1	3	5
Cows	Fresh	2.7	3.5	1.3	0.97
	Frozen	2.5	4.0	1.5	1.0
Sheep	Fresh	6.5	5.5	5.0	4.0
	Frozen	3.2	5.9	5.2	4.87
Chicken	Fresh	2.5	4.0	1.57	2.96
	Frozen	7.0	6.5	2.0	3.1
Fish	Fresh	9.7	14.7	9.5	8.5
	Frozen	12.5	15.5	10.1	9.5

- All results in the table is the rate of repeating.
- Revised- L.S.D. for effect of type of meat=1.31
- Revised- L.S.D. forefeet of type of treatment =0.6
- Revised- L.S.D. forefeet of type of concentration of the brine = 1.4
- Revised- L.S.D. for effect of introduction between type of meat and type of treatment =1.1
- Revised-L.S.D. for effect of introduction between type of meat and concentration of the brine = 2.1
- Revised- L.S.D. for effect of introduction between type of meat, type of treatment and concentration of the brine = 3.3

دراسة التركيب الكيميائي والصفات الفيزيائية للحوم الطازجة والمجمدة المأخوذة من أنواع من الحيوانات المختلفة

خديجة صادق جعفر

قسم الصناعات الغذائية، كلية الزراعة، جامعة البصرة، البصرة، العراق.

الخلاصة

هدفت الدراسة الحالية إلى دراسة التركيب الكيميائي والصفات الفيزيائية للحوم الطازجة والمجمدة

المأخوذة من أنواع من الحيوانات المختلفة (أبقار وأغنام ودجاج وأسماك).

تم تقدير التركيب الكيميائي (الرطوبة والبروتين والدهن والرماد) لعينات اللحوم الطازجة والمجمدة، بعد ذلك تم

خلط العينات الطازجة والمجمدة من اللحوم مع محاليل ملحية بتركيز 0،1،3،5 %، ثم قُدر فيها الرقم

الهيدروجيني (pH) كذلك قيست سعة حمل الماء لتلك اللحوم.



اشارت النتائج الاحصائية عند مستوى ($P \leq 0.01$) الى وجود فروق معنوية لتاثير نوع اللحم على مكونات التركيب الكيميائي وعلى قيم الرقم الهيدروجيني وقيم قابلية حمل الماء، اما نوع المعاملة فكان معنوياً على نسبة الرطوبة وقيم قابلية حمل الماء فقط، وتبين من النتائج الاحصائية ان التداخل بين نوع اللحم ونوع المعاملة كان معنوياً على قيم قابلية حمل الماء فقط، واثرت التداخل بين نوع اللحم وتركيز المحلول الملحي وكذلك التداخل الثلاثي على قيم قابلية حمل الماء فقط ولم يؤثر على قيم الرقم الهيدروجيني، في حين ان التداخل بين نوع المعاملة والتركيز لم يكن له تأثيراً معنوياً على هذه العوامل.

استنتج من الدراسة الحالية وجود اختلافات بين أنواع اللحوم الحمراء والبيضاء في التركيب الكيميائي، كما أن للتركيز الملحية المختلفة تأثير في اختلاف قيم الرقم الهيدروجيني وسعة حمل الماء للعينات الطازجة والمجمدة للحوم الحمراء والبيضاء.

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