Republic of Iraq Ministry of Higher Education & Scientific Research University of Al-Qadisiyah College of Veterinary Medicine



## Effect of usage salts on as preservative on chemical and physical composition of Iraqi fish meat

A Graduation Project Submitted to the Department Council of the Internal and Preventive Medicine-College of Veterinary Medicine/ University of Al-Qadisiyah in a partial fulfillment of the requirements for the Degree of Bachelor of Science in Veterinary Medicine and Surgery.

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فَنَعَلَى ٱللَّهُ ٱلْمَلِكُ ٱلْحَقُّ وَلَا تَعَجَلُ بِٱلْقُرْءَانِ مِن قَبْلِ أَن يُقْضَى إِلَيْكَ وَحْيُهُ وَقُل زَبِّ زِدْنِي عِلْمَا ٢



## **Certificate of Supervisor**

## I certify that the project entitled (Effect of usage salts on as preservative on chemical and physical composition of Iraqi fish meat)

(**in Al-Qadisiyah province**) was prepared by **Noorldeen Hakim ALnaily** under my supervision at the College of Veterinary Medicine / University of Al-Qadissiyah.

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1 / 3 / 2018

## **Certificate of Department**

We certify that Noorldeen Hakim ALnaily has finished his Graduation Project entitled (Effect of usage salts on as preservative on chemical and physical composition of Iraqi fish meat)

and candidate it for debating

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# Dedication

# To

# all people ... who love me...

#### Summary

This research was carried out to investigate the effect of using different salt concentrations on the chemical & physical composition of fish meat, Three different salt concentrations were used (10%,20% and 30%), Samples of carp fish that were brought from the markets of Diwaniyah city, After treatment with the three salts concentrations, the samples were taken randomly after 7 days of treatment for the purpose of chemical & physical analysis, The results of chemical&physical analysis of fish meat showed a significant decrease (P>0.05) in the value of pH, as well as decrease in protein, fat and moisture ratio Compared to non treated with salt (fresh fish) This is due to the salting process, which causes escape the water from tissues and changes in the osmosis and the formation of fats and proteins in general

Key word: salts, Fish, Preservation, Chemichal composition, Microkjeldal, Soxhlet

#### **1-Introduction**

Marine and fish are among the finest and most useful meat for humans and are the main foods that supply the human brain and the body with the necessary nutrients such as vitamins A, D, E, K and minerals such as calcium, phosphorus and fatty acids (1)

Recent studies have confirmed the many benefits of fish in the prevention of diseases such as asthma, heart disease, dementia and the prevention of strokes. Fish is also used to prevent cancer because it contains a high proportion of unsaturated fats (Omiga three), which reduces the risk of cancer by 5% (2)

carp are one of the most common fish species in Iraq, in addition to other species such as Barbus. Freshly caught fish are more susceptible to corruption and decomposition because fish begin to deteriorate as soon as water leaves. This is an obstacle to their use and production. Investors resort to common methods Currently keeping meat such as freezing, drying and salting (3)

The preservation is the process of processing foods in different ways for the purpose of storage for a long time Salting is one of the common methods in keeping fish because it is inexpensive and does not need energy and gives a reasonable food value in addition to it makes the storage period longer because salt absorbs a lot of water in the meat and makes it difficult for microorganisms to live (4) It also salt gives-taste and flavor characteristic desired by the consumer as high concentrations of salt to remove water from the protein and thus increase the deposition of protein and this leads to the hardness of the fish (5) There are many factors that affect salting, such as salinity concentration in saline solution and temperature. Salinity increases with high temperature and salt quality\_ roof salt requires a longer solubility of soft salt-(6) Despite the development of the process of keeping fish meat and the discovery of new materials in conservation, salting remains the best and easiest methods. 1- Find out how salting affects on the chemical composition of fish meat.

2-Comparison between salts concentrations in the effect on the chemical composition of fish meat.

#### **2-Literature Review**

#### 2-1 -Salting fish

Fish are kept in several ways, such as freezing, , salting, drying, smoking, canning, and using atomic radiation(3).

Salting is the group of Physical and chemical processes performed on fish in order to preservation ,The salt penetrates the body of the fish and of water and moisture from the tissues and gives a causes escape distinctive taste and flavor to these fish (7)

Since acient time, fishermen have come in far more than they need fish, and because electricity was not available to them to store the surplus ice, and also because the sea fluctuated in the stormy days, fishermen can not go fishing for many days, and the citizen can not bear patience for fish, They invented the salty, using the means of salting invented by the ancient man to save the meat of animals and fish. Salting was one of the things that provided man with his need of fish in the stormy days. He kept his power without cooling, and did not spoil under the hotter temperatures (8)fish should be fresh and high -quality as salting is not suitable with bad or old fish and corrupt Cleaning is also very important in the process of salting, where all the water must be clean and uncontaminated and all waste must be removed from the place of salting, and should also pay attention to the cleanliness of the tools used in the process of salting like knife and spoons and others(7)

The concentration of salt determines the type of microorganisms that grow and activate in the medium where the salt is present. It has been found that the high concentration of saline solution can prevent the activity of non-aerobic bacteria such as( *Clostridium*) and air bacteria such as ( *Bacillus*) (9).

#### 2-2 -Methods of salting

For the success of the salting process, the entire surface of the fish must be touched with the salt solution. There are several methods of salting

(1) Dry salting

depends on the size of the fish, where it depends on the mixing of salt with fish such as shrimp and anchovy. This method is simple and is used with small or large fish, which has been processing

(2) mixed salting

This method is followed by the slow process of salting and depends on placing asmall amount of concentrated saline solution in the bottom of the tank and then put the fish fins until a relatively thick mixture is formed. The fish are completely covered with the solution and the salt is then spread over it and another layer of fish

Salting with salt solution (3)

In this method, only a saline solution is used, or a new or previous preparation is use (9).

The preservative action of salt can be explained as follows:

1-It has a inhibitory effect of microorganisms and increase this effect in the presence of acids

2-has the ability to make the moisture in the food is linked when ionizing salt to sodium ion and chlorine ion, where the molecules of water around these ions and this water is not collected can not be used by microorganisms

3-has an effect in the drying of the cell protoplasm because the chlorine ion works to oxidize the enzymatic system in the cell and stop its activity and causes high pressure Osmuzy (10).

#### **3-Materials and Methods**

#### **3-1** -Materials

Samples of fresh carp fish (Cyprinus Carpio) were purchased live from local markets of Diwaniyah city The fresh water carp were selected ,washed to remove external dirt dried with disposable towel paper, measured and weighted. The average length of the fishs wer 30 cm and their average weight were 100g The fish samples washed again and left to drain and towel papers were used fasted the draining method ,the analysis was determind by using AOAC (11) methods.

#### 3-2 -Preparing

Each fish was salted put salt all over of body fish on the gill and gutted with coarsely ground sal then put in plastic container then divided in to three groups each group contains 10 samples, Then subjected to different salt concentrations (10%,20% and 30%). Each fish was salted separately and the samples were taken randomly after 7days after salting about (100 gm) of each samples to make chemical analysis,the concentration of salt prepare according to the equation (11) :

 $\frac{mass(gm)}{volum(ml)} \times 100\%$ 

#### 3-3- Moisture rating

The moisture was estimated by placing 2 g of meat in a jar of a known weight and then introduced into An electric oven at a temperature of 105 m for 4 hours and then refrigerated and then weighed and the moisture % was calculated by equation (11):

 $\frac{weight \ loss(gm)}{weight \ of \ fish \ after \ dring(gm)} \times 100\%$ 

#### 3-4-PH

PH was determined with a glass electrode of a newly calibrated Digital PH meter (PH meter) at room temperature. One gram of fresh and salted fish were blended with 10 ml distilled water, and stirred well with a magnetic stirrer, then put in centrifuged, and supernatant was taken for measurement .

#### **3-5-Determination of protein**

Protein ratio was estimated by Semi-Microkjeldal method in nitrogen estimation Total and 25.6 agent were used to obtain protein ratio.

#### **3-6-** Estimate of fat

The fat ratio was estimated using Soxhlet method by using Soxhlet system .

#### **3-7-Statistical analysis**

The statistic analysis was performed with SPSS(2010) by analysis of variance significance a t( P>0.05).

#### **4-Results**

## Effect of different salt concentration of chemical composition of fish (10meat %,20%, 30%)

Salt%	PH	Lipid %	Protein %	Moisture%
Fresh fish	7.1± 0.94a	$3.9 \pm 0.94 a$	24.1 ±0.22a	70.8 ±1.3a
10	6.5 ± 0.20b	$3.2 \pm 0.34 \mathbf{b}$	20.9 ±0.45b	62. 3 ±0.72b
20	6.2 ± 0.91c	2.8 ±0.21b	$18.5\pm0.51c$	55.7 ±1.8c
30	6.0 ± 0.90c	1.5 ±1.1c	$16.6 \pm 0.34 d$	51.2 ± 0.1 d

#### 4-1-PH Value

The results showed a significant (P<0.01) decrease in the pH value of (6.5  $\pm$  0.20,6.2  $\pm$  0.91, 6.0  $\pm$  0.90 ) respectively for the three concentrations. The lowest value of pH was 30% Reaching(6.0  $\pm$  0.90).

#### 4-2-Lipid%

The results showed a significant (P<0.01) decrease in the pH value of (3.2  $\pm$  0.342.8  $\pm$ 0.21, 1.5  $\pm$ 1.1,) respectively for the three concentrations. The lowest value of lipid was 30% Reaching(1.5  $\pm$ 1.1).

#### 4-3-Protein%

The results showed a significant (P<0.01) decrease in the pH value of  $(20.9 \pm 0.45, 18.51 \pm 0.5, 16.6 \pm 0.34)$ , respectively for the three concentrations. The lowest value of protein was 30% Reaching(16.6 ± 0.34).

#### 4-4-Moisture%

The results showed a significant (P<0.01) decrease in the pH value of  $(62.3 \pm 0.72, 55.7 \pm 1.8, 51.2 \pm 0.1)$ , respectively for the three concentrations. The lowest value of moisture was 30% Reaching(51.2  $\pm$  0.1).

#### **5-Disscusion**

5-1-

#### PH

The increase in the percentage of pH is due to increased acidity, which occurs due to the breakdown of fat by lipid-free enzymes, which result the free fatty acids and thus increase acidity and decrease PH

PH is also affected with an increase in the storage period, which is less with the progress of the storage period and it is a measure of the extent of the breakdown of carbohydrates Especially the glycogen And converted to lactic acid after the death of the fish (12) The results of this research are agree with the findings of (13)

#### 5-2-Lipid

The reason for the low fat percentage is due to loss of fat with fluids with the osmotic effect that caused by the salting process (12) The results of this research are agree with the findings of (14)

#### 5-3-Protein

The process of salting leads to dissolved protein in the brine and deposition of proteins and increased osmosis pressure (15) The results of this research are agree with the findings of (14) Which found that the process of salting leads to the lack of protein, but , not agreet with (16) which found that the process of salting leads to increase the proportion of protein in fish meat

#### 5-4-Moisture

Microorganisms need water for the purpose of growth and control of moisture is The most important steps of conservation in food .The reason for the low moisture in the fish is the result of water withdrawal from the tissue due to the salting process (12)) The results of this research are agree with the findings of (14) Which found that the process of salting leads to reduce the amount of moisture in the fish body and also with (16)

#### 6-Conclusions

We conclude from this study that

1- salt is an easy-to-use, readily available and gives an acceptable taste and flavorolled.

2- Adding of salt result in lowering the protein ,lipid moisture and PH value in the fish meat. and the best salt concentration is considered to be 30%.

3- The higher concentration gives more storage for meat.

#### 7-Recommendations

following recommendations can be propose:

1- Future research for the use of salt with other preservateves such as turmeric

2- Another study to find out the effect of salt on the chemical composition of red meat and chicken meat.

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#### الخلاصة

اجري هذا البحث لمعرفة تأثير أستخدام التراكيز المختلفة من الملح على التركيب الكيميائي والفيزيائي للحوم الأسماك استخدمت ثلاثة تراكيز من الملح (30,20,10) جمعت عينات الأسماك من أسواق مدينة الديوانية، بعد معاملتها يالتراكيز تم أخذ العينات بصورة عشوائية لغرض التحليل الكيميائي والفيزيائي واظهرت نتائج التحليل للأسماك انخفاض معنوي ( (P>0.05) في قيمة الأس الهيدروجيني كذلك انخفاض في البروتين و الدهن ونسبة الرطوبة مقارنة مع ألأسماك غير المعالجة (الأسماك النقية ) وهذا يرجع الى عملية التمليح التي تسبب هروب الماء من الانسجة وتغير الأوزموزية وتغير في تكوين الدهون والبروتينات بصورة عامة .