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Research article

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

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Abstract

This research was carried out to investigate the effect of using different salt concentrations on the chemical & physical composition of fish meat, to Find out how salting effects on the chemical composition of fish meat and to Comparison between salts concentrations in the effect on the chemical 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 AL-Qadisyah 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 genera

Keywords: Chemical composition, Fish, Microkjeldal, Preservation, Soxhlet, Salts

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 Qspecies 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,

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salting remains the best and easiest methods. 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 causes escape of water and moisture from the tissues and gives a distinctive taste and flavor to these fish (7). Since ancient 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 cannot go fishing for many days, and the citizen cannot 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 (9) 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*)(10).

Materials and Methods

Ethical approval

The Animal Ethical Committee of Veterinary Medicine College, University of Al-Qadisiyah, Iraq, has approved the present study.

Materials

(30)Samples of fresh carp fish (Cyprinus Carpio) were purchased live from local markets of AL-Qadisiyah city The fresh water carp were selected and washed to remove external dirt dried with disposable towel paper, measured and weighted. The average length of the fishes were 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 determined by using AOAC (11) methods.

Preparing

Each fish was salted put salt all over of body fish on the gill and gutted with coarsely ground salt 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):

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

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 105C° m for 4 hours and then refrigerated and then weighed and the moisture % was calculated by equation (11):

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

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.

Determination of protein

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

Estimation of fat

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

Statistical analysis

The statistical analysis was performed with SPSS (2010) by analysis of variance significance at (P<0.05).

Results

Table(1):Effect of different salt concentration of chemical composition of fish meat (10 %,20%, 30%)

Salt%	PH	Lipid %	Protein %	Moisture%
Fresh fish	7.1± 0.94a	3.9 ± 0.94a	24.1 ±0.22a	70.8 ±1.3a
10	6.5 ± 0.20b	3.2 ± 0.34b	20.9 ±0.45b	62. 3 ±0.72b
20	6.2 ± 0.91c	2.8 ±0.21b	18.5 ± 0.51c	55.7 ±1.8c
30	6.0 ± 0.90c	1.5 ±1.1c	16.6 ± 0.34d	51.2 ± 0.1 d

Different litters significant variances (P<0.05)

PH Value

The results showed a significant (P<0.05) decrease in the pH value of (6.5± 0.20, 6.2±0.91, 6.0±0.90) respectively for the three concentrations. The lowest value of pH was 30% Reaching(6.0±0.90).

Lipid%

The results showed a significant (P<0.05) decrease in the pH value of (3.2±0.342. 8±0.21, 1.5±1.1) respectively for the three concentrations. The lowest value of lipid was 30% Reaching (1.5 ±1.1).

Protein%

The results showed a significant (P<0.05) decrease in the pH value of (20.9±0.45, 18.51 ±0.5, 16.6 ±0.34), respectively for the three concentrations. The lowest value of protein was 30% Reaching(16.6 ± 0.34).

Moisture%

The results showed a significant (P<0.05) decrease in the pH value of (62.3±0.72, 55.7±1.8, 51.2±0.1**),** respectively for the three concentrations compared with fresh fish. the lowest value of moisture was 30% Reaching(51.2 ± 0.1).

Discussion

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).

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).

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 a greet with (16) which found that the process of salting leads to increase the proportion of protein in fish meat.

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

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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).

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