Journal Basrah Researches ((Sciences)) Vol. 34 , No. 6. 15 December 2008

Alterations of Chemical Composition of Common Carp Cyprinus Carpio by Different Traditional Cooking Methods

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ISSN -1817 -2695

((Received 29/10/2007 , Accepted 9/11/2008))

Abstract

Effects of different processing methods on chemical composition of common carp Cyprinus carpio were determined. Thirty samples of fish into three forms (grilled,fried with fat and fried with oil)were analyzed to estimate content of protein,Lipid,moisture and ash. Moisture ,protein,Lipid and ash contents of raw fish were 73.69%,17.72% ,5.70% and 1.92% ,respectively. While in agrillied fish,the contents were 56.84%,22.06%,16.38% and 3.32%, respectively. In afried fish with fat, the contents were 83.38%, 9.74%, 6.50% and 1.37%, respectively. For afried fish with oil,the values obtained were 60.90%,22.87%,13.96% and 1.92%,respectively. The highest protein content(22.87%)were recorded in fried samples with oil. The highest lipid(16.38%)and ash concen (3.32%)were recorded in grillied samples. The statistical analysis revealed that there were significant differences ($p<0.05$)of moisture content among all samples whereas there were no significant differences($p<0.05$)of ash content among them. However,there were no significant differences($p<0.05$)of protein and lipid contents between fried fish with oil and grilled were observed morever,no significant differ- ences($p<0.05$)of lipid content between raw and fried fish with oil were seen.

Key words: Fish,Conventional Cooking, proximate composition.

Introduction

Fish has long been a favorite meal of people,even before the discovery of oils and natural gas[1].During the past 20 years,there were an interest in dietary components such as fish,which are rich sources of omega-3 fatty acid,and might favorably improve lipid profiles and reduce risk of coronary heart disease[2]. Additional reports on fish consumption benefits included their hypolipidemic and/or antiatherogenic effects[3],decreased risk of prostate cancer [4],reduced occurrence of renal cell carcinoma in women[5],reduced risk of dementia and alzheimer disease in certain conditions[6]. Another study on the chemical composition of raw fish indicated that fish is a good source of minerals and many trace elements[1].Although fish is a good source of some essential nutrients, cooking practices could cause modifications in chemical composition,fatty acids and amino acids as well as changes in solubility and nutritional quality of fish [7,8]. Another study indicated that cooking of fish leads to alteration in cholesterol,fat and protein content but the cholesterol content of raw and cooked fishes was not directly correlated to fat content [9] Although reports are available on the composition of fish,studies to assess the chemical composition and nutritional profile of cooked fish are at most scanty. In addition,there is no information on the role of different cooking methods on the nutrient composition. This study is therefore,an attempt to assess the chemical composition of cooked fish using the traditional methods of cooking.

Materials and Methods

Sample Preparation

A total of 16 filets of the common carp *Cyprinus carpio* with weight ranging between 40-50 grams were examined. Before analysis,the head,tail,fins,vesira and skin of fish were removed. Fish filets were obtained by carefullly cutting the fish lengthwise along the backbone to obtain maximum amount of flesh(4filets)where bones were excluded.First the filet was fried with oil sunflower oil;The second filet was fried with the animal fat;Third filet grilled in oven 250C° for half an hour whereas the forth filet was left as raw material for comparison .

Chemical Analysis

The chemical composition analysis of the treated and raw fish were done as follows: Samples of fish muscle were dried at 90C° in a forced air oven in order to determine the moisture content. Protein was determined using the Kjeldahl method after acid digestion. Ash was determined by the ignition of samples in a muffle furance at 525C° for 12hours. These procedures were all applied according to official A.O.A.C.method[10] and all data were subjected to statistical analysis according to the procedure reported by[11].

Results and Discussion

The results of Table 1 shows number,weight of filet,the time and temperature of cooking. Table 2 represents the chemical common carp composition,that there was treated with different traditional cooking methods. Significant differences($p<0.05$)of moisture content among all samples were found whereas there were no significant differences($p>0.05$)of ash content among them. However,there were no significant differences($p>0.05$)of protein and lipid contents between fried fish with oil and grilled were observed morever were;No significant differences($p>0.05$)of lipid content between raw and fried fish with oil seen. On comparing the raw and cooked fish,the results indicated that cooking method had considerable effect on the chemical composition.The highest protein concent were recorded for fryied with oil(22.87%) is due to concentration of f muscle as a result of moisture loss[12]. Lipids content was increased during cooking by different methods; is a result of uptake of oil by fish muscles during cooking process[13]. The moisture was decreased during different cooking methods,and the lowest levels of moisture (56.84%) was the fillets cooked by grillied method.

Table 1: Parameters of Experimental Conditions

Method of Cooking	No. of Filets	Weight Average (gm)	Time of Cooking(min)	Temp. of Cooking(c°)
Frying with Fat	4	40	15	140
Frying with Oil	4	50	20	140
Grilling	4	45	30	250
Raw	4	47	-	-

Table 2: The Chemical Composition of Common Carp *Cyprinus carpio* by Diffarent Traditional Cooking Methods

Sample	moisture%	Protein%	Lipid%	Ash%
Raw Fish	73.69a	17.72a	5.70a	1.92a
Frying with Fat	83.38b	9.74b	6.50a	1.37a
Frying with Oil	60.90c	22.87c	13.96b	1.96a
Grilling	56.84d	22.06c	16.38b	3.32a

The small letters denote differences with groups($p<0.05$)

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تأثير أساليب المعالجة التقليدية على التركيب الكيميائي للكارب العادي

عادل يوسف الدبيكل [1] و بتول حسين هيثم المهناوي [2] و آلاء طارق عبد الواحد [2]

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الخلاصة

تم استقصاء تاثير اساليب المعالجه التقليديه المختلفه على التركيب الكيميائي للكارب الاعتيادي ، حيث تم تحليل 30 عينه من السمك (النيء ، المشوي ، المقلي مع الدهن , الزيت) للتعرف على مدى تاثير اساليب المعالجه التقليديه على التركيب الكيميائي لها (الرماد ، والدهون ، الرطوبه والبروتين)وقد وجد ان الرطوبه ، البروتين ، الدهون والرماد في السمك النيء كانت 73,69 % ، 17,72 % ، 5,70 % ، 1,92% على التوالي بينما في السمك المشوي كانت 56,84 % ، 22,06 % ، 16,38 % ، 3,32 % على التوالي . في السمك المقلي بالدهن المحتويات كانت 83,38 % ، 9,74 % ، 6,50 % ، 1,37 % على التوالي اما السمك المقلي بالزيت فكانت النتيجه60,90 % ، 22,87 % ، 13,96 % ، 1,92 % على التوالي. اعلى محتوى للبروتين(22,87%) كان للسمك المقلي بالزيت في حين السمك المقلي بالدهن سجل اقل قيمه (9,74%)و اعلى محتوى للدهن(16,38%)والرماد(3,32%)سجل من قبل السمك المشوي بالفرن. كان هناك فرق معنوي في نسبه الرطوبه بين جميع العينات في حين لم يكن هناك أي فرق معنوي في نسبة الرماد بالاضافه إلى عدم وجود أي فرق معنوي في نسب البروتين والدهن مابين السمك المقلي بالزيت والسمك المشوي.