# PROCESSING OF NON-TRADITIONAL FISHERY PRODUCTS

By

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B.Sc. Agric. Sc. (Food Science), Moshtohor, Zagazig University. (2005)

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# ABSTRACT

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This study was carried out to process fish pastirma from catfish (CFP) as well as common carp fillets (CCFP) and fish chips using silver carp fish meat. Fish pastirma samples were subjected to physicochemical, microbiological and organoleptic analysis on 0, $3^{th}$, $6^{th}$, $9^{th}$, $12^{th}$ and $15^{th}$ days of storage at 25±2ºC and on 0, $7^{th}$, $14^{th}$, $21^{th}$and $30^{th}$ days of storage at refrigeration (5±1ºC). The chemical composition of fish pastirma (moisture, protein, fat, ash, carbohydrate and salt contents) were variable significantly ($p<0.05$) during storage, the moisture and carbohydrate contents decreased significantly in opposite trend with the protein, fat and ash contents during storage at 25±2ºC. While, these attributes were inconsistent during storage at 5±1ºC. Finally, the changes in chemical composition of fish pastirma during cold storage were less than that occurred during storage at 25±2ºC. The TVB-N, TMA-N and tyrosine values increased significantly ($p<0.05$) for all fish pastirma samples until end of storage. While, TBA value of fish pastirma showed unsteadily trends during storage periods. TVB-N, TMA-N and TBA values of fish pastirma were not exceed on the acceptable limits, but TVB-N values of refrigerated fish pastirma were higher than permissible limit of acceptability at the end of storage. The storage periods caused significant increasing and decreasing ($p<0.05$) in pH value of (CFP) and (CCFP), respectively at the end of storage, at which the WHC of refrigerated fish pastirma were higher than that stored at 25±2ºC. During storage the TBC and aerobic spore forming bacteria numbers of fish pastirma were increased significantly ($p<0.05$), but, the coliform and molds & yeasts counts were <10 $x10^1$ cfu/g during days analysis of differently storage. The sensory evaluation attributes showed clearly decreasing scores during storage at 25±2ºC, whereas the refrigerated samples could be retained its eating quality until end

of storage. However, all fish pastirma samples were accepted after 15 days at ambient temperature and 30 days of cold storage.

Fish chips produced from silver carp meat showed the best formulas. Fish chips subjected to organoleptic analysis as "fried ", physicochemical and microbiological analysis on 0, 1st, 2nd and 3rd months of storage at -18±2ºC. The drying process had significant effect ($p<0.05$) on the chemical composition of fish chips.

After drying, the TVB-N, TMA-N and tyrosine values showed significant increasing ($p<0.05$). The physical properties of fish chips in term of WHC, cooking loss and pH values were decreased significantly after drying. The pH values increased at the end of frozen storage. At which, WHC% and cooking loss% showed significant decline ($p<0.05$) after the first month of storage. In addition, the significant differences were found between the formulas in physical properties. The numbers of (TBC) decreased significantly ($p<0.05$) after drying. On contrary, the numbers of aerobic spore forming bacteria of fish chips were increased. The microbial loads appeared significant decline after the 1st month of frozen storage. The coliform group, molds & yeasts as well as salmonella & shigella were absent in all samples. The raw and dried fish chips formulas were accepted in terms of sensory analysis; moreover, the best formula was **(D)** that consisted of (35% fish, 35% potato and 25% starch).

Therefore, fish pastirma and fish chips as new products considered as one of the successful methods to improve catfish, common carp and silver carp fish utilization, which is undesirable in its fresh form because its sensorial properties and a one of the trials for high production of fish farms from these species in Egypt.

**Keywords:** Fish pastirma - Fish chips - *Clarias lazera* - *Cyprinus carpio* - *Hypophthalmichthys molitrix* - Organoleptic evaluation - Physicochemical properties - Microbiological quality – Chemical quality.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| ANOVA | : Analysis of variance |
| $^{o}$C | : Celsius degree |
| cm | : Centimeter |
| cfu/g | : Colony forming unit/ gram |
| CFP | : Catfish pastirma |
| CCFP | : Common carp fish pastirma |
| d/w | : on dry weight basis |
| g | : Gram |
| hr. | : Hour |
| kg | : Kilo gram |
| L | : Liter |
| MDA or Mal | : Malonaldehyde |
| mg | : milligram |
| ml | : milliliter |
| mm | : millimeter |
| MSG | : Monosodium glutamate |
| nm | : Nanometer |
| OD | : Optical density |
| ppm | : Part per million |
| TBA | : Thiobarbituric acid |
| TCA | : Trichloroacetic acid |
| WHC | : Water holding capacity |
| w/w | : on wet weight basis |

# INTRODUCTION

Fish is considered as a highly protein rich food in relation to vegetable and other animal foods. It is a fact that millions of people in developing countries are suffering from malnutrition mainly because of protein deficient food. Fish can play an important role as a source of protein of high digestibility, minerals especially calcium and iron as well as vitamins **(Coway *et al.*, 1981)**. Fish flesh is tasty and highly digestible, it minimizes the risk of heart diseases and increases life expectancy **(Barlas, 1986)**. Fish is a major source of proteins of high digestibility and are rich source of lysine and containing amino acids. In Africa, over 17.5% of the animal protein comes from fish **(Olatunde, 1989)**. Fish is a good source of protein and can be used as an alternative to meat (lamb and chicken). The reasons are fish had low cholesterol, optimal protein amount, high digestibility and polyunsaturated fatty acids such as omega-3and essential amino acids **(Boran and Köse, 2007)**.

Consequently, Fish processing has a special concerning in fishing and aquaculture industries. The processing and preservation of fresh fish were of almost importance since fish is highly susceptible to deterioration immediately after harvest and also to prevent economic losses **(Okonta and Ekelemu, 2005)**. In addition, fish processing has a special place in fishing and aquaculture industries. In recent years, the increasing number of working women has directed the consumer preferences to ready-to-eat fish products like fish burger, fish cakes, fish crackers, fish fingers, marinated products, *etc.* **(Kilinc, 2007)**. Modern life-style demands a consistent food supply with high quality that is convenient as well as affordable **(FAO, 2007)**. There are several animal and plant food savers an available worldwide. Among them, the most important animal protein saver that caters to the human needs comes from aquaculture. The world population is continuing each and every year that will exceed 10 billion by the year 2050 **(Subasinghe, 2005)**. The global demands compel a consistent food supply that too in good quality. These demands are fulfilled by the intensive aquaculture practices in particular to