SOME CHANGES THAT OCCUR THROUGH THE PROCESSING AND STORAGE OF FISH

By

Mohamed Farag Mohamed Nasr Khallaf

B.Sc. (Food Technology) Ain Shams Univ. 1977

M.Sc. (Food Technology) Ain Shams Univ. 1982

THESIS

SUBMITTED IN PARTIAL SATISFACTION

OF THE REQUIREMENTS

OF THE (Ph. D.) DEGREE

IN

Food Technology

FACULTY OF AGRICULTURE

AIN SHAMS UNIVERSITY

Dept. of Food Science

1986

C

APPROVAL SHEET

Name : Mohamed Farag Mohamed Nasr Khallaf.

Title: Some Changes That Occur Through The Processing And Storage Of Fish.

This Thesis has been approved by:

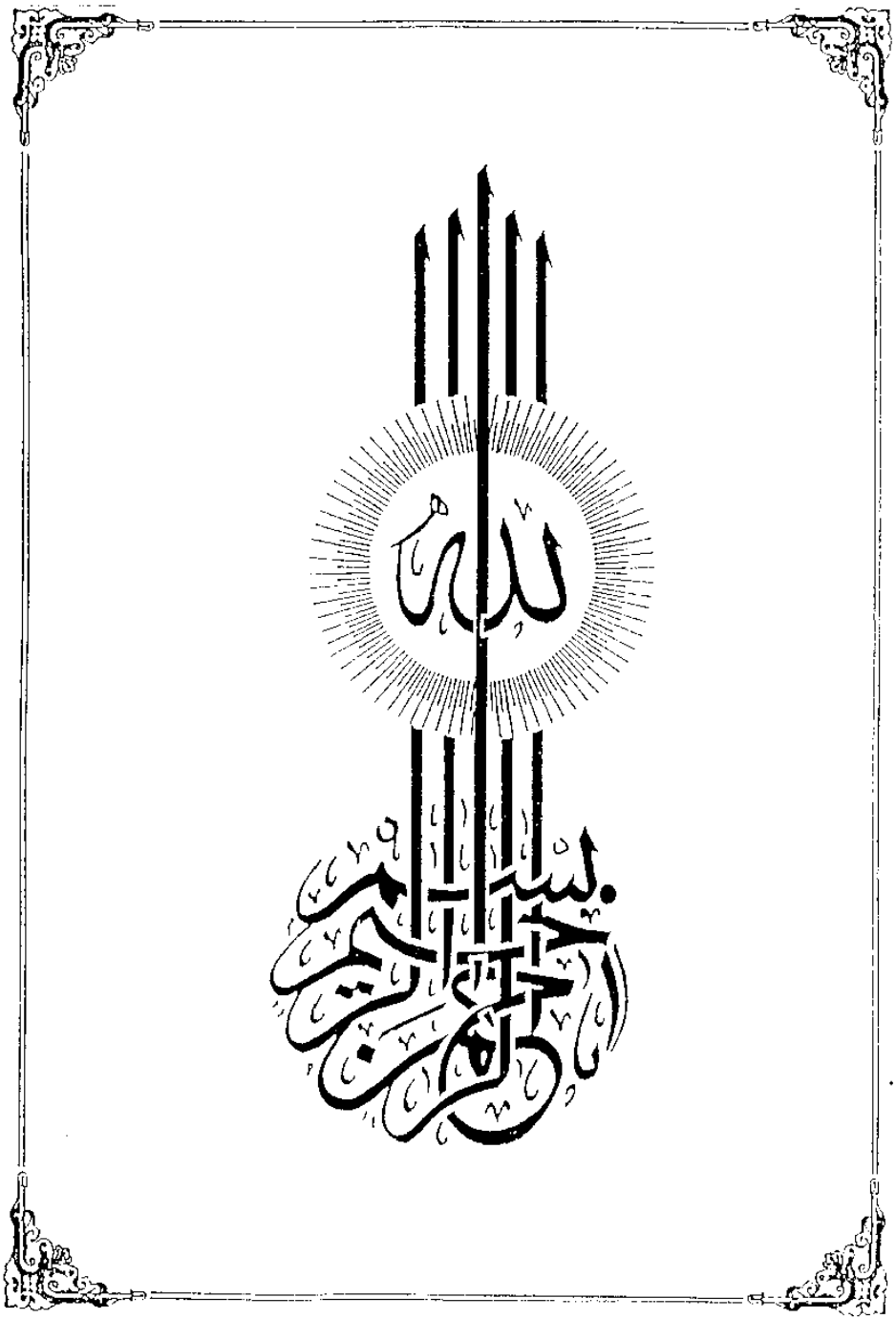
Prof. Dr. ----------

Prof. Dr. ----------

Prof. Dr. ----------

Committee in charge

Date 31 / 7/1986.



ACKNOWLEDGEMENT

I fail to find the proper words to express my great indebtdness to all who had supervised and planned the thesis:

Prof. Dr. YEHIA M. HASSAN, Governor of Menofia Governorate.

Prof. Dr. M. AMIN ABD ALLAH, Professor of Food Sci., Fac. of Agric., Ain Shams Univ.

They were most generous with their knowledge, advice and time in guiding me throughout the whole study.

Deepest thanks to Dr. M.H.O. EL KALYOUBI, Associate Prof. of Food Tech., Fac. of Agric., Ain Shams Univ., Food Sci. Dept., for his continual encouragement. My appreciation is extended to Dr. R.M. EL MAHDY, Associate Prof. of Food Tech., Fac. of Agric., Ain Shams Univ., Food Sci. Dept., for his valuable suggestions.

Last, but not least, my gratitude to Dr. A.A. ABOU ARAB, Lecturer of Food Tech., Fac. of Agric.,Ain Shams Univ., Food Sci. Department, all the staff members of the Food Sci. Dept., Fac. of Agric., Ain Shams Univ., and Mr. Ezzat Zahran, Director of El-Zawia Fish Farm in Kafr El-Sheikh Governorate for his kind helps during sampling.

DEDICATION

To the source of tenderness which disappeared

To my mother's spirit in the otherworld

C O N T E N T S

INTRODUCTION

INTRODUCTION

Fish is known to be of great nutritional value for human consumption as its protein has a high biological value and contains all the essential amino acids. It is also a satisfactory source of lipids with the presence of the essential fatty acids and minerals especially magnesium, phosphorus, iron and copper.

Over the past several years seafood sales have increased, primarily due to greater awareness of health and nutrition as well as the relative cost of fish with respect to meat and poultry; (Campbell 1982). These elevated sales have been mostly for traditional species because of the lack of consumer acceptance for other species.

Tapping of the wealth based on fish sources has become an urgent need for the survival of the human race. Most nations planned for expanding their fish catching power through sending fishing fleets with mother ships and floating factories into virgin areas of the globe's vast ocean. Controlled fish cultivation is gaining major significance in many lands. Man-

made reservoirs are being exploited for fish raising also on a large scale. With regard to fish farms, the need for a comprehensive resource management as well as wise and efficient utilization have become paramount in face of the mounting population pressures. Even the organized cultivation of the seas, mariculture, now looms as an inevitable and intriguing task for future generations. All these circumstances are contributing to bringing into focus the world-wide importance of fish, shell-fish and other aquatic organisms suitable for food and feed; (Borgstrom 1961).

In Egypt, and due to the lack of large capital investments for realizing fish catch overseas,— a tendency towards buildup fish farms were considered. Fish production (in Egypt) amounted to about 300,000 tons and The General Authority For Fish Resources Development are giving much attention towards fish production, processing and distribution of carp and mullet fish.

Carp fish was imported from South East of Asia and farmed successfuly in Egypt. The production of carp farms usually distribute according to marketing grades depending on its weight and size. Mullet fish was also farmed in governmental fish farms with carp and bolti fish. It has drawn attention because of rapid quality changes during shipping and storage.

Deterioration in the quality of fish muscle had frequently occurred in lipids and proteins during frozen storage as a result of undesirable technological processes; (Sikorski 1978, 1980). These changes are of great commercial importance since they determine storage life of frozen seafoods. However, lipids and proteins are two groups of the various components that affect edible quality attributes and lipids are most important since they may undergo several deteriorative reactions during processing and storage, e.g., hydrolysis and oxidation. These can adversely affect flavor, odor, color and texture.

The following points had been researched within the scope of such study:

1. Major constituents and physicochemical properties of common carp and mullet fish after freezing and storage at -18°C for 8 months.

2. Chromatographic analysis and identification of fish lipids changes.

3. Amino acid constituents and protein evaluation.

However, these previous aspects were also considered as a suggested technique for predicting storage period of the investigated fish samples.

REVIEW OF LITERATURE