

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار





بعض الوثائق الأصلية تالفة





بالرسالة صفحات لم ترد بالأصل



Menoufia University
Faculty of Home economics
Dept. of Nutrition and Food Science

NUTRITIONAL AND TECHNOLOGICAL STUDIES ON THE CURING OF HORSE BEAN (*VICIA FABA*)

BY

Mahasen Ali Mohamed kotb

B. Sc. (Specialized Education), Ashmon, Menoufia, Egypt (1994)

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of Master**

IN

Nutrition and Food Science

SUPERVISORS

Prof. Dr.

Ramadan Ahmed Hassan

Prof. of Biochemistry
Faculty of Agriculture
Mansoura University

Prof. Dr.

Safaa Mohamed Ali Hassan

Prof. of Biochemistry
Faculty of Agriculture
Mansoura University

Dr.

Yousif Abd El-Aziz Elhassaneen

Lecturer of Nutrition and Food Science
Faculty of Home Economics
Menoufia University

1998

B

11/11/98

Menoufia University
Faculty of Home economics
Dept. of Nutrition and Food Science

NUTRITIONAL AND TECHNOLOGICAL STUDIES ON THE CURING OF HORSE BEAN (*VICIA FABA*)

BY

Mahasen Ali Mohamed kotb

B. Sc. (Specialized Education), Ashmon, Menoufia, Egypt (1994)

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of Master**

IN

Nutrition and Food Science

SUPERVISORS

Prof. Dr.

Ramadan Ahmed Hassan

Prof. of Biochemistry
Faculty of Agriculture
Mansoura University

Prof. Dr.

Safaa Mohamed Ali Hassan

Prof. of Biochemistry
Faculty of Agriculture
Mansoura University

Dr.

Yousif Abd El-Aziz Elhassaneen

Lecturer of Nutrition and Food Science
Faculty of Home Economics
Menoufia University

1998



DEDICATION

TO ALLAH TAALA ..

TO MY FATHER ..

TO MY FAMILY, MOTHER, BROTHER AND SISTERS ..

Menoufia University
Faculty of Home Economics
Nutrition and Food Science Dept.

APPROVAL SHEET

The Researcher : Mahasen Ali Mohamed Kotb
Title of Thesis : Nutritional and technological studies on the curing of horse bean (*Vicia faba*).
Degree : Master in Nutrition and Food Science

This thesis has been approved by :

Name	Profession	Signature
Dr. Mohamed Moustafa El-Sayed Ali	Head Dept. of Nutrition and Food Science, Dean Faculty of Home Economics, Menoufia University	M. M. El-Sayed
Dr. Fawzy Mahmoud Shehab El-Din	Prof. of Agric. Biochemistry Faculty of Agriculture Mansoura University	F. M. Shehab El-Din
Dr. Ramadan Ahmed Hassan	Prof. of Agric. Biochemistry Faculty of Agriculture Mansoura University	R. A. Hassan

Committee in Charge

Date / / 199

Menoufia University
Faculty of Home Economics
Nutrition and Food Science Dept.

Supervision

The Researcher : Mahasen Ali Mohamed Kotb

Title of Thesis : Nutritional and technological studies on the curing of horse bean (*Vicia faba*).

This thesis Supervised By :

Name	Profession	Signature
Dr. Ramadan Ahmed Hassan	Prof. of Agric. Biochemistry Faculty of Agriculture Mansoura University	R. A. Hassan
Dr. Safaa Mohamed Ali	Prof. of Agric. Biochemistry Faculty of Agriculture Mansoura University	Safaa
Dr. Yousif Abd El-Aziz Elhssaneen	Lecturer of Nutrition and Food Science, Faculty of Home Economics, Menoufia University	Yousif

ACKNOWLEDGMENTS

I would like to thank **Dr. Ramadan Ahmed Hassan**, Professor of Biochemistry, Faculty of Agriculture, Mansoura University, Mansoura, Egypt, for his supervision and great helpful throughout the course of this investigation.

Deep thanks and appreciation are also due to **Dr. Safaa Mohamed Ali Hassan**, Professor of Biochemistry, Faculty of Agriculture, Mansoura University, Mansoura, Egypt, for her general logistical support, helpful efforts and continuous supervision.

My deepest gratitude, sincere appreciation and infinite thanks are due to **Dr. Yousif Abd El-Aziz Elhassaneen**, Lecturer of Nutrition and Food Science, Faculty of Home Economics, Menoufia University, Shebin El-Kom, Egypt, for his supervision, great helpful, valuable suggestions and criticism, and faithful guidance in presenting this study. Also, Dr. Yousif offered me every possible assistance during the course of this study involving the experimental design, the operation of chemical analysis apparatus, ...etc. (no easy task). Really, his advises, encouragement's and helpful were and still endless.

Finally, my deepest thanks are expressed to all post graduate colleagues working with Dr. Yousif Abd El-Aziz El-Hassaneen, in particular Mrs. Sahr A.. El-Hakeem, and Mrs. Mervat Mahran who offered me

assistance during the course of this study involving the operation of some apparatus and organoleptic evaluation.

And last but not least, sincere thanks are extended to my family: my parents, my brothers and my sisters. Their love, affection and advice were a constant source of strength and peace.

LIST OF CONTENTS

	Page
LIST OF ABBREVIATION	
INTRODUCTION	1
AIM OF INVESTIGATION	4
REVIEW OF LITERATURE	5
 I. General properties of horse bean seeds	 5
I.1 Physical properties	5
I.2 General Chemical composition	6
I.3 Amino acids content and Protein quality	8
I.4 Nutritional quality of horse bean seeds	9
1.4.1 Vicine and convicine content	9
1.4.2 Polyphenolic substances "Tannins"	11
 II. Effect of soaking on the physical, chemical and functional properties and nutritive value of faba beans	 13
II. 1 Physical properties	14
II. 2 Chemical properties and nutritive value	15
II. 3 Functional properties of protein	17
II.3.1 Nitrogen solubility index (NSI)	18
II. 3.2 Water absorption	18
II.3.3 Emulsifying capacity	19
 III. Effect of canning on the chemical composition and nutritive value of faba beans	 21
 MATERIAL AND METHODS	 24
RESULTS AND DISCUSSION	38
 CHAPTER I: General properties of horse bean seeds	 38
I.1 Physical properties	38
I.2 General Chemical composition	38
I.3 Nutritional quality and functional properties of horse bean seeds	42

CHAPTER II: Determination the activity of pepsin and trypsin enzymes used in soaking solutions process	45
CHAPTER III: Effect of soaking on the physical, chemical properties and nutritive value of faba beans	52
III. 1 Physical properties	52
III. 1.1 Hydration coefficient	52
III. 1.2 Cooking time	55
III. 2 Chemical properties and nutritive value	58
III. 2.1 Protein content	58
III. 2.2 Total ash content	58
III. 2.3 Carbohydrate content	63
III. 2.4 Crude fat and fiber	68
III.3 Functional properties of protein	68
III.3.1 Nitrogen solubility index (NSI)	73
III.3.2 Water absorption	73
III.3.3 Emulsifying capacity	78
III.3.4 Antinutritional factors of horse bean seeds	81
CHAPTER IV	88
IV.1 Gross chemical and nutritional evaluation of canned horse beans products as affected by different soaking solutions	88
IV.2 Evaluation of protein quality of canned horse bean products as affected by different soaking solutions	93
IV.3 Organoleptic evaluation of canned horse bean products as affected by different soaking solutions	97
ENGLISH SUMMARY	100
REFERENCES	111
ARABIC SUMMARY	

LIST OF ABBREVIATIONS

A.O.A.C.	Official methods of analysis of the Association of Official Analytical Chemists.
B.V.	Biological value
Cm	Centimeter
E.A.A.	Essential amino acids
E.A.A.I	Essential amino acid index
E.C.	Emulsifying Capacity
F.A.O.	Food and Agricultural Organization of the United Nations
F.D.A	Food and Drug Administration.
Fig	Figure
gm	Gram
G.D.R.	Gram consumed to cover the dairy Requirement
hrs	Hours
Kg	Kilogram
Kcal	Kilocalory
Min	Minute
ml	Milliliter
mg	Milligram
nm	Nano mole
O.D.	Optical density.