

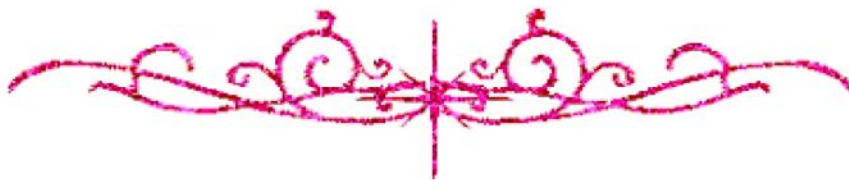
# بسم الله الرحمن الرحيم



**HOSSAM MAGHRABY**



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



**HOSSAM MAGHRABY**



# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

### قسم

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



## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



A decorative flourish in red ink, consisting of a central vertical line with symmetrical, flowing, scroll-like patterns on either side.

**HOSSAM MAGHRABY**



# بعض الوثائق الأصلية تالفة



**HOSSAM MAGHRABY**





بالرسالة صفحات

لم ترد بالأصل



HOSSAM MAGHRABY

B16424

# **STUDIES ON HIGH FIBER BREAD**

**BY**

**ABD-EL TAWAB SAAD BARAKAT**

B. Sc., Agric., (Food Science) Faculty of Agriculture Zagazig university, 1992

Diploma of High Studies Major of Hospitals and Institutions Dietetics

Faculty of Home Economics Menoufia Uni., (1995).

## ***THESIS***

Submitted in partial Fulfilment in the Requirements  
for the dgree of

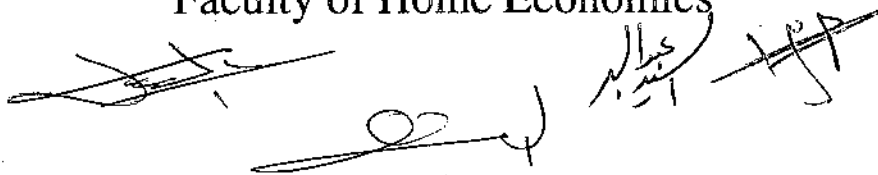
**Master of science**

In

**Nutrition and Food Science**

Nutrition & Food science Department.

Faculty of Home Economics



**Menoufia University**

**1998**

# *Under the Supervisors Of*

**Prof. Dr. El Sayed Abd-El Bar Salem**

Prof. and Head of Food Tech.,  
and Dairy Department  
National Research Center  
Dokki, Cairo

**Prof. Dr. Ahmed El Sayed El Bardeny**

Head of Researches and Experiments.  
North Cairo Flour Mills Co.  
Cairo

**Dr. Olfat Mohamed Khater**

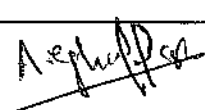
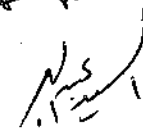

Leacturer of Nutrition and Food Sci.  
Faculty of Home Economic,  
Menoufia Univ.

**Approval Sheet**  
**Studies On High Fiber Bread**

By

*Abd El-Tawab Saad Abd El-Tawab Barakat*

This thesis for Degree of M.Sc. in Nutrition and Food science has been approved by :

Name	Profession	Sign
1. Prof. Dr. Ahmed Abd El-Ghafaar	- El-Gharbia Governor	
2. Prof. Dr. El-Sayed A. Salem	- Head of Food Tech. and Dairy dep. (National Research Center)	
3. Prof. Dr. Mohamed M. El-Sayed	- Dean of Home Economic (Menoufia Uni.)	M. M. El-Sayed
4. Prof. Dr. Ahmed E. Al-Bardeny	- Head of Researches and Exprements. (North cairo Flour Mills Co.)	



## ACKNOWLEDGMENT

*First of all* , ultimate thanks are due to Allah, who without his aid this work could not be done.

I would like to express my deepest gratitude to *Prof. Dr. El-Sayed A. Salem*, Head of Food Tech. and Dairy Department, National Research Center; *Prof. Dr. Ahmed E. El-Bardeny*, Head of Researches and Experiments, North Flour Mills Co., and *Dr. Olfat M. Khater*, Lecturer of Nutrition, Faculty of Home Economics, Menoufia Uni. for their supervising the work , their encouragement, valuable help, faithful advice providing facilities needed and their continuous assistance throughout the investigation and the writing of thesis.

My gratefulness and gratitude are due to *prof. Dr. Samir El-Dashloty* Ex Dean of faculty of Home Economics, Menoufia University and to *prof. Dr. Mohamed Mostafa El-Sayed* Dean of faculty of Home Economics menoufia University for their valuable guidance interest advice and the great facilities they offered to me and constant encouragement throughout this investigation.

Special thanks and much gratitude to *Prof. Dr. Tarek El-Adawi* Asociated prof. of Food Tech., Food Tech. Dep., Faculty of Agriculture, Menoufia Uni. for his valuable helping during this study.

Thanks are also due to staff members of North Cairo Flour Mills Co., (Recearches and Experiment Sector) and to staff member of Misr Food Industries Co., for their valuable helping during this study.



## Dedication

To Allah in his supremacy that has  
bestowed upon me with...

Great father...

Tender mother...

And dear brothers...

I wish mercy be upon my father and  
plenty of health and happiness for my  
mother and my brothers.

Your Son

*Abd El-Tawab*

## Contents

	<b>Page</b>
I. Introduction .....	1
2. Aim of the work .....	2
3. Review of literature .....	3
3.1. Aflatoxin contamination .....	3
3.2. Dietary fiber .....	5
3.2.1. Definition, classes and chemistry of dietary fiber .....	5
3.2.2. Healthy effects of dietary fiber. ....	8
3.2.3. Dietary fiber sources. ....	14
3.2.4. Chemical composition of fiber sources .....	16
3.2.5. Phytic acid and high fiber bread. ....	18
3.2.6. Chemical composition of raw materials. ....	21
3.2.6.1. Wheat flour. ....	21
3.2.6.2. Potato peels. ....	23
3.2.6.3. Sugar-beet pulp. ....	23
3.2.7. Effect of fiber sources on rheological and baking properties. ....	24
3.2.7.1. Potato peels. ....	24
3.2.7.2. Sugar beet pulp. ....	27
4. Materials and methods .....	28
4.1. Materials. ....	28
4.2. Methods. ....	29
5. Results and Discussion. ....	37
5.1. Studies on the commercial high fiber bread samples. ....	37



## II

	Page
5.2. Dietary fiber components of potato peels, sugar-beet pulp and shorts. ....	39
5.3. Studies on the raw materials used. ....	42
5.3.1. Aflatoxins presence in raw materials used. ....	42
5.3.2. Wheat flour. ....	43
5.3.2.1. Chemical composition of wheat flour. ....	43
5.3.2.2. Rheological properties of wheat flour dough (72%) ....	45
5.3.2.2.1. Farinograph test. ....	45
5.3.2.2.2. Extensograph test. ....	45
5.3.2.3. Baking properties of flour (72%) bread. ....	48
5.3.3. Potato peels and sugar-beet pulp. ....	48
5.3.3.1. Chemical composition of potato peels. ....	48
5.3.3.2. Chemical composition of sugar-beet pulp. ....	50
5.3.3.3. Mineral contents of potato peels and sugar-beet pulp. ....	51
5.3.3.4. Effect of replacement of wheat flour by potato peels on alpha-amylase activity. ....	52
5.3.3.5. Effect of replacement of wheat flour by sugar-beet pulp on alpha-amylase activity. ....	57
5.3.3.6. Effect of replacement of wheat flour by potato peels on the chemical composition of formulated bread. ....	61
5.3.3.7. Effect of replacement of wheat flour by sugar-beet pulp on the chemical composition of formalated bread. ....	65
5.3.3.8. Effect of replacement of wheat flour by potato peels and sugar-beet pulp on the rheological properties. ....	69

### III

	Page
5.3.3.8.1. Effect of replacement of wheat flour by potato peels on farinogram parameters. ....	69
5.3.3.8.2. Effect of replacement of wheat flour by potato peels on extensogram parameters. ....	76
5.3.3.8.3. Effect of replacement of wheat flour by sugar-beet pulp on farinogram parameters. ....	81
5.3.3.8.4. Effect of replacement of wheat flour by sugar beet pulp on extensogram parameters. ....	88
5.3.3.9. Effect of replacement of wheat flour by potato peels and sugar-beet pulp on baking characteristics. ....	93
5.3.3.9.1. Quality of high fiber bread produced by utilization of potato peels as a source of fiber. ....	93
5.3.3.9.2. Quality of high fiber bread produced by utilization of sugar-beet pulp as a source of fiber. ....	96
5.3.3.9.3. Organoleptic properties of high fiber bread produced by utilization of potato peels or sugar-beet pulp as a source of dietary fiber. ....	99
5.3.3.9.3.1. Organoleptic properties of high fiber bread produced by utilization of potato peels. ....	99
5.3.3.9.3.2. Organoleptic properties of high fiber bread produced by utilization of sugar-beet pulp. ....	103
6. References. ....	106
7. Summary. ....	126

الملخص العربي

# ***Introduction***



## 1- INTRODUCTION

Dietary Fiber physiologically, has been defined as those endogenous components of plant materials in the diet, that are resistant to digestion by the acid and enzymes in the human gastrointestinal tract. It include cellulose, hemicellulose, pectins, lignin, gums and mucilages. Epidemiological observations that several diseases of "civilization" such as coronary heart disease, diabetes, cancer of the colon and constipation, are most prevalent have heightened interest in the inclusion in our diets of dietary fiber. The diet content of dietary fiber is essential for normal bowel function, softer stools, rapid transit time, decrease the civilization diseases and weight control (*Pomarenz et al., 1977*).

Bread and baked products are the most important sources of dietary fiber in the total food consumption. High fiber bread in general are cereal diet and are more effective than low carbohydrate diabetic diet in the control of maturity-onset diabetes. Many studies on high non soluble fiber bread are avbailable but there are not sufficient works on high fiber bread with low phytic acid content, to reduce serum cholestrol.

Potato peels and sugar-beet pulp have no phytic acid (*Toma et al., 1979; Sandstrom et al., 1987*).

In Egypt, usually commercial types of high fiber bread contain bran (shorts) as a fiber source, potato peels and sugar beet pulp have more soluble fibers than of bran, soluble fibers are more effective in lowering serum cholesterol

From the economical point of view each of potato peels and sugar-beet pulp are a by-products and inexpensive.