شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

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

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

بعض الوثائق الأصلية تالفة

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

بالرسالة صفحات

لم ترد بالأصل

HOSSAM MAGHRABY

UTILIZATION OF SOME PLANT OILS IN PRODUCTION OF BUTTER SUBSTITUTES AND KEEPING THEIR QUALITY BY GAMMA IRRADIATION

BIKKEA

by

EI-SAYED AHMED MOHAMED AFIFI

B.Sc. Agric. (Food Science) 1975

Ain Schams University

M.Sc. Agric. (Food Science) 1985

Zagazig University

Thesis

Submitted In Partial Fulfillment of the Requirements for the Degree of Doctor of philosophy in (Food Science)

To

Food Science Dept.,

Faculty of Agriculture at Moshtohor

Zagazig University

1997

Approval Sheet

Title: UTILIZATION OF SOME PLANT OILS IN PRODUCTION OF BUTTER SUBSTITUTES AND KEEPING THEIR QUALITY BY GAMMA IRRADIATION.

Name: EL-SAYED AHMED MOHAMED AFIFI

THIS THESIS HAS BEEN APPROVED BY:

Prof. Dr F. Ashour

Prof. Dr R.M.A El Saadany

Prof. Dr S.S. Ibrahim

Prof. Dr El-Bedawey

(Committee in charge)

Date: 20/3 /1997

ACKNOWLEDGMENT

The author wishes to express his deepest appreciation and sincere gratitude to **Prof. Foad Ashour**, Professor of Food Science and Technology and Dean Faculty of Agriculture, Moshtohor, Zagazig University and also extended to **Prof. Raouf El-Saadany**, Professor of Food Science and Technology, Faculty of Agriculture, Moshtohor, Zagazig University, for supervision and the kind attention and great help giving every possible advice throughout the course of this investigation.

My sincere thanks are due to **Prof. Aly Hassan Rady**, Prof. And head of Food Irradiation Unit, Plant Research Department, Nuclear Research Center, Atomic Energy Establishment for suggesting the problems, supervising the laboratory work, providing all facilities and simulative discussion, valuable suggestions and constructive criticism throughout writing the manuscript.

My cordial thank are also extended to **Prof. H.H. Khalaf**, Professor of Food Science and Technology, Faculty of Agriculture, Moshtohor, Zagazig University, for encouragement and kind advice during this work.

It also gives me pleasure to record my deepest appreciation and sincere gratitude to **Dr. Zakaria Ibrahim Matar,** lecture in Food Microbiology Laboratory, Radiomicrobiology Department, National Center for Radiation Research and Technology, for his interest and continuous great help during the microbiological work.

Sincere thanks are also extended to **all stuff members** in Food Irradiation Unit in Plant Research Department for their helps in laboratory works.

Sincere thanks are also extended to **all stuff member and workers** in Food Science Department of the Faculty of Agriculture, Moshtoher, Zagazig University.

LIST OF CONTENTS

Introduction.....1

Aim of Investigation.....4

Review of Literature.....5

Materials and Methods.....35

Results.....43

Summary..... 95

References.....102

Arabic Summary

Abbreviations

1- R.B.D	Refined Bleached deodorized
2- T.B.H.Q.	Tertiary Butyl Hydro Quinone
3- P.O.	Palm Oil
4- P.S.	Palm Stearin
5- L.D.L.	Low Density Lipoproteine
6- H.D.L.	High Density Lipoproteine
7- C.H.D.	Coronary Heat Disease

INTRODUCTION

INTRODUCTION

Butter is a smooth, light-yellow, reasonably firm but still easily spreadable mass, which mainly consists of milk fat and water. The product butter has existed since man has drunk milk. From archaeological finds it is known, for instance, that butter was used by ancient Persians and ancient Egyptians. Butter was also known to Greeks and Romans as a basis for ointment and beauty aids.

In addition to the high price of butter, that stops many people from buying it, butter - as all animal fats - is characterized by containing high levels of cholesterol which contributed to the development of atherosclerosis and increased coronary heart disease risk. Therewithal, gallstones are made of cholesterol and the surgical removal of the gall bladder is one of the most common operations in the United States.

Moreover, one of the long term objectives of the Department of Health and Human Services by the year 2000 is to have at least 2000 brand items of processed food products on the market that are reduced in cholesterol

On the other hand, hydrogenation of vegetable oils (included in margarin production) leads to an extreme reduction in the essential linoleic acid content; produces trans isomers of various unsaturated fatty acids which behave like saturated acids in rising the cholesterol levels and increased risk of atherosclerosis. Thereto, several studies implicated fatty acids in increasing the risk of cancer.

Palm oil, unlike other vegetable oils needs no hydrogenation being semi-solid in nature, free of cholesterol and trans acids and it can be used in many food applications. The production of palm oil has increased up to a total world production of about 12 million metric ton in 1992 (Anon, 1992). In addition, mention should be made of the nutritional benefits of the minor compounds of palm oil as it is the richest natural source of β-carotene and vitamin E group substances; moreover, palm oil is unique in containing mainly toco trienols. Also, the availability of palm stearin, which is harder than unfractionated palm oil, offers further possibilities for producing blends of a particular consistency. (PORIM, 1981 and Berger, 1994).

Numerous bacteria, yeasts and molds are capable of causing both hydrolytic and oxidative deterioration of butter and margarin (Smith and

Alford, 1984). In addition, some pathogens could grow in these fatty products (Varnam and Sutberland, 1994).

Low temperature storage must not be seen as a means of eliminating pathogenic micro-organisms, and as the use of traditional preservatives is on the decrease, the search for other preserving methods appears to be worthwhile.

The application of gamma irradiation is known to be safe up to 10 kGy (IAEA, 1980), and it is recognized as the most effective method for eliminating the bacteria that cause most kinds of food poisoning.

AIM OF INVESTIGATION