بسم الله الرحمن الرحيم

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تم عمل المسح الضوئي لهذة الرسالة بواسطة / سامية زكى يوسف

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات:

- بالرسالة صفحات لم ترد بالأصل
- بعض الصفحات الأصلية تالفة
- بالرسالة صفحات قد تكون مكررة
- بالرسالة صفحات قد يكون بها خطأ ترقيم

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

NUTRITIONAL AND TECHNOLOGICAL STUDIES ON FORTIFICATION OF SOME FOODS WITH WHEY

BY

Nagla Ali Magd El-Sheikh
B. Sc. Home Economics (Food Science and Nutrition). , Fac. of Home Economics, Minufiya University, Shebin El-Kom, Egypt (1995)

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

IN
Nutrition and Food Science

SUPERVISORS

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Title of Thesis : Nutritional and technological studies on fortification of some foods with whey

Degree : Master in Nutrition and Food Science

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SUPERVISION

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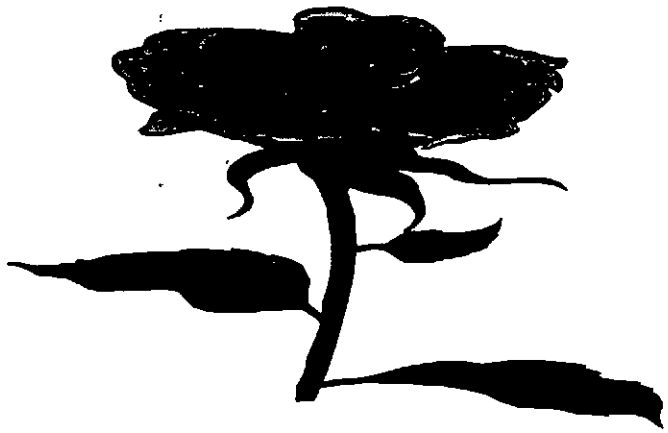

DEDICATION

TO ALLAH IN HIS SUPER MERCY THAT HAS BESTOWED UPON ME WITH....

GREAT FATHER...
GREAT AND TENDER MOTHER...
DEAR BROTHERS AND SISTERS...
AND DEAR HUSBAND AND DAUGHTER

I WISH MERCY BE UPON MY FATHER AND PLENTY OF HEALTH AND HAPPINESS FOR MY MOTHER, BROTHERS, SISTERS, HUSBAND AND DAUGHTER

NAGLA EL-SHEIKH

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

LIST OF CONTENTS

LIST OF ABBREVIATIONS

A.A.C.C.	American Association of Cereal Chemists.
A.O.A.C.	Official methods analysis of the association of official analytical chemists
B.U.	Barabender unit
Cm	Centimeter
F.A.O.	Food and agricultural organization of the united nations
Gm	Gram
G.D.R	Gram consumed to cover the dairy requirement
kg	Kilogram
kcal	Kilocalory
min	Minute
ml	Milliliter
mg	Milligram
P.S.	Percent of satisfaction
RDA.	Recommended dietary allowances
Sec	Second
SD	Standard Deviation
T.N.	Total nitrogen

INTRODUCTION

INTRODUCTION

Whey is the watery portion or serum that separates from the curds during conventional cheese making or casein manufacture (Kosikowski, 1978). It constitutes about 85 to 90% of the volume of the milk used for transformation into ripened cheese and it retains about 55% of the milk nutrients. These, among the best that milk can offer, include soluble proteins, lactose, mineral elements, and vitamins. Additionally, whey contains variable amounts of lactic acid and non-soluble nitrogen. Although whey contains an excellent array of high quality nutrients the overabundance of it has caused many problems. The large amounts of whey produced odor, killed fish and strained sewage systems (Kosikowski, 1977).

Environment pollution and high costs of whey disposal have encouraged scientists to produce innovative means to utilize whey. Much work has been done to produce acceptable foods from this by-product. The high nutritional value and low cost of whey make it an excellent food component. It can be incorporated advantageously into various food formulations. For example, lactose which is the major component, acts as a carrier for flavor and color when added to many foods such as beverages, soups bakery products and confectionery products (Bills, 1974; Holsinger, 1976; Poznanski *et al.*, 1977; and Sahloul, 1997). There is also an enhancement of i.e mouth feel when is used an ingredient. Whey solids tenderize and help retain moisture and freshness in foods in contrast to the firmness of products containing skim milk. These properties are especially noticeable in the tender crispness of pie or pizza crust (Nielsen, 1976; and Helal and El-Shaer, 1998). Also, whey solids in combination with small quantifies of gelatin have been advocated as a

new kind of flow agent that has the capacity to hold twice its own weight in oils, fats, and flavors (Mathur and Shahani, 1979). This property is especially useful for the production of non-aqueous products. Whey-based coatings have been suitable for food applications. For space foods, whey-based coating containing high-melting fats are used to reduce the rate at which these products disintegrate in the mouth and permit easy swallowing (Gillies, 1973).

On another side, modified whey solids may be added to bovine milk to give it characteristics of human milk. In Japan have shown that infants fed on such humanized formulations having casein to whey protein ratio of 60 : 40 (as in human milk) showed normal physiological functions. Feeding of humanized formulations exerts considerably lower osmolar loads on the kidney and increases nitrogen retention and utilization (Saita, 1972).

In Egypt, the aquatic environment is looks like a sink which recipient large quantities of waste whey every day. It also caused stress in sewage system. Although , an extensive amount of research has been done by Bishai *et al.*, (1979); El-Farra *et al.*, (1981); Khorshied *et al.*, (1987); Sahloul, (1997); and Helal and El-Shaer, (1998) to incorporate advantageously whey into various food formulations but it still needs more and more research in the future to solve this problem.

AIM OF INVESTIGATION

The present investigation was aimed to:

1. Utilize the high nutritive value and low cost of waste Deumiatte cheese whey as replacement for dough water in bread making.

2. Studying the baking and taste properties of bread made from flour as influenced by incorporation with different levels of Deumiatte whey.

3. Utilize Deumiatte cheese whey as replacement for water in some home foods such as Mefalfel rice.

4. Determination of some physical and chemical alterations induced in some home made foods including bread and rice of as influenced by incorporation with different levels of Deumiatte whey.

5. Evaluation of the nutritional value and characteristics of these fortified home made foods including, energy value, satisfaction of the daily requirements of adult man (25 - 50 years old) in protein and minerals.