VALUE ADDITION IN GROUNDNUT, SESAME AND COCONUT

By

DHARSHIENY THAMPAPILLAI

A RESEARCH REPORT

SUBMITTED IN PARTIAL FULFILMENT OF

THE REQUIREMENT OF THE

ADVANCED COURSE

IN

FOOD SCIENCE AND TECHNOLOGY

FOR

THE DEGREE OF

BACHELOR OF SCIENCE IN AGRICULTURE

FACULTY OF AGRICULTURE

EASTERN UNIVERSITY, SRILANKA

1998

LIBRARY 9 ... 1999 ... University, Sri Lanka.

FAG88

Project Report
Library - EUSL

L 6106

Approved By

.....

Mr.T.D.W. Siriwardena
Supervisor,
Head/Soybean Food Research Unit,
Gannoruwa,
Peradeniya.

Date---16/02/99---

.....

Dr. S. Raveendranath,
Head / Department of Agronomy,
Faculty of Agriculture,
Eastern University, Sri Lanka,
Chenkalady.

Date---16/2/99---

PROCESSED
Main Library, EUSL

ABSTRACT

Experiment were conducted to evaluate the possibilities of manufacturing sterilized groundnut and sesame milk in fluid form as Coconut milk substitutes. Further, the above commodities were spray dried. Their organoleptic properties were evaluated. For this purpose both sterilized and spray dried coconut milk was manufactured.

In sensory evaluation studies, the panelist preferred a milk curry prepared using coconut milk to both groundnut and sesame based milk. However based on sensory evaluation studies, it was observed that milk prepared using groundnut based milk, both fluid and dried forms have a potential as a replacer for coconut milk.

Moisture sorption studies of coconut based spray dried commodity was conducted. The objective of moisture sorption studies were to determine Bruner – Emmet – Teller (BET) monolayer value which gives an indication as to the optimal level of moisture in the product for long term storage. The monoloyer values were evaluated at room temperature (30^0C) and 5^0C. They were 4.67 and 6.93 grams water per 100 gram dry coconut milk powder, respectively.

Moisture sorption studies indicated that the heat of sorption values at 4, 6 and 8 percent moisture levels were 5765, 2174 and 1427 calories per mole of water sorbed by the product. Therefore the product is most hygroscope and need moisture proof material for packaging.

CONTENTS

	PAGE
ABSTRACT	i
ACKNOWLEDGEMENT	ii
CONTENTS	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
LIST OF PLATES	x
ABBREVIATIONS	xi
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW	3
2.1 GROUND NUT	3
2.1.1 PRODUCTION AND YIELD	3
2.1.2 STORAGE	3
2.1.3 NUTRITIVE VALUE OF GROUND NUTS	4
2.1.4 UTILIZATION OF GROUNDNUTS	5
2.1.4.1 PEANUT BUTTER	5
2.1.4.2 PEANUT MILK, CURD, CHEESE	5
2.1.4.3 GROUNDNUT FLOUR	6
2.1.4.4 MEAT ANOLOG FROM DEFATTED PEANUT FLOUR	6
2.1.4.5 PRODUCT DEVELOPMENT FROM DEFATTED PEANUT FLOUR	7
2.2 SESAME	7
2.2.1 PRODUCTION AND YIELD	7
2.2.2 COMPOSITION OF SESAME SEED	7
2.2.3 UTILIZATION OF SESAME PRODUCTS	8
2.2.3.1 SESAME OIL	8
2.2.3.2 SESAME ROLL	8
2.2.3.3 SESAME MEAL	8
2.3 COCONUT	9
2.3.1 YIELD AND SEASONALITY	9
2.3.2 COMPOSITION AND NUTRITIVE VALUE OF COCONUT	9

2.3.3 UTILIZATION OF COCONUT PRODUCTS 10
2.3.4 COCONUT PRODUCTS 10
2.3.4.1 COCONUT MILK 11
2.3.4.2 COCONUT CREAM 12
2.3.4.3 COCONUT MILK POWDER 14

2.4 EQUIPMENTS USED TO THE PREPARATION OF PRODUCTS

2.4.1 FOR MILK
2.4.1.1 COLLOID MILL 15
2.4.1.2 HOMOGENIZER 16
2.4.2 FOR STERILIZED MILK
2.4.2.1 AUTOCLAVE 16
2.4.3 FOR SPRAY DRIED POWDER
2.4.3.1 SPRAY DRYER 16

2.5 MOISTURE SORPTION STUDIES 20

2.5.1 METHOD TO DETERMINE SORPTION ISOTHERMS 20
2.5.2 DETERMINATION OF BET MONOLAYER VALUE 21
2.5.3 BET MONOLAYER VALUE FOR COCONUT MILK POWDER AND OTHER PROCESSED COMMODITY 22
2.5.4 HEAT OF SORPTION PROPERTIES AND SIGNIFICANCE 23
2.5.5 HEAT OF SORPTION 23

2.6 SENSORY EVALUATION 23

2.6.1 USES OF SENSORY EVALUATION 24
2.6.2 PROBLEMS ASSOCIATED WITH SENSORY ANALYSIS 24
2.6.3 THE FOLLOWING RULES SHOULD BE ESSENTIALLY FOLLOWED DURING SENSORY EVALUATION 25

2.6.4 RANKING 27

CHAPTER 3 MATERIALS AND METHODS 28

3.1 RAW MATERIALS 28
3.1.1 PREPARATION OF STERILIZED MILK 28
3.1.1.1 STERILIZED GROUNDNUT MILK 28
3.1.1.2 STERILIZED SESAME MILK 28
3.1.1.3 STERILIZED COCONUT MILK 28
3.1.2 PREPARATION OF SPRAY DRY POWDER 29
3.1.2.1 GROUNDNUT POWDER 29
3.1.2.2 SESAME POWDER 29
3.1.2.3 COCONUT POWDER 29

3.2 PROXIMATE ANALYSIS 29

3.2.1 DETERMINATION OF MOISTURE 29
3.2.2 DETERMINATION OF CRUDE PROTEIN 30
3.2.3 DETERMINATION OF CRUDE FAT 31
3.2.4 DETERMINATION OF CRUDE FIBER 32
3.2.5 DETERMINATION OF ASH 33
3.2.6 DETERMINATION OF CARBOHYDRATE 34

3.3 MOISTURE SORPTION STUDIES 34

3.3.1 CHEMICALS, EQUILIBRIUM RELATIVE HUMIDITY, AND WATER ACTIVITY WITH SATURATED SALT SOLUTION AND TEMPERATURE 34
3.3.2 PREPARATION OF SAMPLE FOR SORPTION STUDIES 35
3.3.3 INSTRUMENT PREPARATION 35
3.3.4 DETERMINATION OF MOISTURE SORPTION 35
3.3.5 DETERMINATION OF BRUNNUER-EMMER-TELLER(BET) 35
3.3.6 DETERMINATION OF HEAT OF SORPTION 37

3.4 SENSORY EVALUATION 37

3.4.1 MATERIALS FOR TASTE PANEL 38
3.4.2 CODING THE SAMPLE
3.4.3 PREPARATION OF SAMPLES 38
3.4.4 CONDUCTING THE TASTE PANEL 38
3.4.5 EVALUATION OF THE SAMPLES BY PANEL MEMBERS 39
3.4.6 STATISTICAL ANALYSIS 39

CHAPTER 4 RESULTS AND DISCUSSION 41

4.1 PROXIMATE COMPOSITION OF GROUNDNUT, SESAME AND COCONUT 41
4.2 MOISTURE SORPTION 41
4.2.1 SORPTION DATA OF COCONUT MILK POWDER 42
4.2.2 BET MONOLAYER VALUES
4.2.2.1 BET MONOLAYER VALUES FOR COCONUT MILK POWDER AT 30^0C 43
4.2.2.2 BET MONOLAYER VALUES FOR COCONUT MILK POWDER AT 5^0C 45
4.2.3 HEAT OF SORPTION 48
4.3 SENSORY PROPERTIES OF SAMPLES 48
4.3.1 TASTE 49
4.3.2 COLOUR 49