

# 127, 17 27, 17 (20) 77, 17 (20









# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم



نقسم بللله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأفلام قد اعدت دون آية تغيرات



### يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15-20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of 15 – 25c and relative humidity 20-40 %



ثبكة المعلومات الجامعية





Information Netw. " Shams Children Sha شبكة المعلومات الجامعية @ ASUNET بالرسالة صفحات لم ترد بالأص

# CHEMCIAL AND TECHNOLOGICAL STUDIES ON SOME VEGETABLE AND FRUIT JUICES

#### BY

#### Bahaa El-Din Moustafa Moustufa

B. Sc Agricultural Science (Food Science)

Zagazig University (1993)

M. Sc Agricultural Science (Food Technology)

Zagazig University (1998)

#### **THESIS**

Submitted in Partial Fulfillment of The Requirement for The Degree of

#### DOCTOR OF PHILOSOPHY

In

Agricultural Science (Food Technology)

Food Science Department Faculty of Agriculture, Moshtohor Zagazig University (Benha Branch)

2002



# CHEMICAL AND TECHNOLOGICAL STUDIES ON SOME VEGETABLE AND FRUIT JUICES.

#### By

#### BAHAA EL-DIN MOUSTAFA MOUSTAFA

B.Sc. Agric. Sci. (Food Science), Zagazig University (1993). M.Sc. Agric.Sci. (Food Technology), Zagazig University (1998).

Under the supervision of:

Prof. Dr. H.A. El-Mansy

Professor & Head of Food Science Dept., Fac. of Agric. Moshtohor, Zagazig Univ.

Hand E Man

Prof. Dr. S.A. Salem

Professor of Food Technology, Department of Food Technology National Research Center.

Dr. M.H.M. Mahmoud

Ass. Professor of Food Technology, Fac. of Agric. Moshtohor, Zagazig Univ. M.H. Mohamal

#### ZAGAZIG UNIVERSITY FACULTY OF AGRICULTURE, MOSHTOHOR

#### APPROVEL SHEET

Name of Student: Bahaa El-Din Moustafa Moustafa

Degree : Ph.D. in Food Technology

Title of Thesis : Chemical and technological studies on

some vegetable and fruit juices.

Approved by:

Prof. Dr. S.K.M. El-Samahy

Professor of Food Technology, Fac. of Agric. Ismaelia, Suez Canal Univ. S.K.EL Samahy

Prof. Dr. A.A. El-Bedawey

Professor of Food Technology, Fac. of Agric. Shibin El-Kom, Minufiya Univ. El Bodowey

Prof. Dr. S.A. Salem

Professor of Food Technology,

Dept. of Food Technology, National Research Center.

Prof. Dr. H.A. El-Mansy

Professor & Head of Food Science Dept., Fac. of Agric. Moshtohor, Zagazig Univ.

Hunds & Man

Dr. M.H.M. Mahmoud

Ass. Professor of Food Science, Fac. of Agric., Moshtohor, Zagazig Univ. M.t. Mohamed

(Committee in charge)

Date: 23 / 10/2002.

#### ACKNOWLEDGMENT

I would like to express my deepest gratitude to *Prof. Dr. Hamdy A. El Mansy*, Head of Food Science Department, Faculty of Agriculture, Moshtohor, Zagazig University and *Prof. Dr. El-Sayed A. Salem*, Prof of Food Tech., Food Tech. Department, National Research Center for their supervision, suggesting the problem, encourage and helpful guidance throughout the course of this study.

I am also grateful to *Dr. Mahmoud H. Mohamed*, Lecture of Food Science, Food Science Department, Faculty Of Agriculture, Moshtohor, Zagazig University for his supervision, encouragement through out this study.

Special thanks are extended to *Dr. Mohsen M. Ashour*, Researcher of Food Tech., Food Tech. Department National Research Center, for his continuous helping and encouragement through out this study.

Thanks are also due to the all Staff Members of Food Technology Department, National Research Center For their helping during this study.

## CHEMICAL AND TECHNOLOGICAL STUDIES ON SOME VEGETABLE AND FRUIT JUICES.

#### **ABSTRACT**

physical, chemical characteristics and flavor compounds of fresh cantaloupe and grapefruit juices were studied. The effect of pasteurization on physical and chemical characteristics was studied. Also the different methods of concentration and their effects on the physical and chemical characteristics and flavor compounds were evaluated. The best method to produce concentrations that content 20-25%, 40-45% and 60-65% total soluble solids was reverse osmosis method, reverse osmosis-freeze concentration method and reverse osmosis-vacuum concentration method, respectively. Moreover, the natural drinks of cantaloupe and grapefruit juices were prepared. It was founded that the best composition of the natural drinks of cantaloupe and grapefruit juices were 15, 13 % total soluble solids and 40, 35 % natural juice, respectively.

AP.	
Hbstract	

#### **ABBREVIATIONS**

a\* Redness

b\* Yellowness

E.A.A Essential amino acids

F.A.N. Free amino nitrogen

F.C. Freeze concentration

F.J. Fresh juice

Gc/Ms Mass spectrometer Chromatography

L\* Lightness

P.J. Pasteurized juice

R.O.C. Reverse osmosis concentration

R.O.F.C. Reverse osmosis and freeze concentration

R.O.V.C. Reverse osmosis and vacuum concentration

R.T Retention time

T.S.S. Total soluble solids

V.C. Vacuum concentration

V.C.S.P Vacuum concentration of serum pulp

#### **CONTENTS**

Subject	Page
1- INTRODUCTION	
2- REVIEW OF LITERATURE	
1- Cantaloupe	
1.1 Chemical and physical characteristics	55
1.2 Volatile components of cantaloupe	8
1.3 Technological process of cantaloupe	11
2- Grapefruit	13
2.1 Chemical and physical characteristics	13
2.2 Volatile components of grapefruit.	16
2.3 Technological process of grapefruit.	17
3- MATERIALS AND METHODS	
Materials	
Methods	
1. Technological process	25
1.1 Extraction of juice	25
1.2 Pasteurization of juice	25
1.3 Removal of grapefruit juice bitterness	26
1.4 Juice concentration	26
1.5 Preparation of the natural drinks	28
2. Analytical methods	
2.1 Chemical methods	29

2.2 Sensory evaluation methods	
2.3 Statistical analysis	
4- RESULTS AND DISCUSSION	
Part I: Cantaloupe	
1.1 Physical and chemical characteristics of fresh cantaloupe juice	35
1.2 Effect of pasteurization on physical and chemical characteristics of cantaloupe juice	37
1.3 Evaluation of different concentration method on the physical and chemical characteristics of cantaloupe juice	43
1.4 Effect of the different concentration methods on the physical and chemical characteristics of to cantaloupe juice.	87
1.5 Preparation of natural drinks from cantaloupe juice	105
Part II : Grapefruit	
2.1. Physical and chemical characteristics of fresh grapefruit juice	113
2.2. Effect of the bitterness removal on the physical and chemical characteristics of fresh grapefruit juice:	115
2.3. Effect of the bitterness removal on the acceptability evaluation of grapefruit juice.	120
2.4. Effect of pasteurization on the physical and chemical characteristics of grapefruit juice.	120

2.5.Evaluation of different concentration methods on the physical and chemical characteristics of grapefruit juice	124
2.6. Effect of the different constituted methods no the physical and chemical characteristics of the grapefruit juice.	166
2.7. Preparation of natural drinks from grapefruit juice	183
SUMMARY	
REFERENCES	201
ARABIC SUMMARY	
	W- VIIII

# INTRODUCTION