TECHNOLOGICAL STUDIES ON PROCESSING OF SOME NON-TRADITIONAL FRUITS

By

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B.Sc. Agric. Sc. (Food Sciences), Fac. Agric., Cairo Univ., Egypt, 1996.

M.Sc. Agric. Sc. (Food Sc. and Tech), Cairo University, 2010.

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ABSTRACT

Aziza Th. Gamal. Technological studies on processing of some Non-Traditional fruits. Unpublished Ph.D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2017

The present study was carried out to throw some light on the best ways to process some non-traditional fruits, to demonstrate their functional properties and changes induced in manufactured products and their induced application in some of the food product to improve their nutritional and their functional properties. Therefore, acerola, anonna, and cactus pear fruits were evaluated for their phenolic and flavonoid contents as well as antioxidant activities in terms of scavenging DPPH free radicals. Acerola juice showed a high content of vitamin C, and total pheolic content comparing with its freeze-dried powder in fresh acerola juice and its freeze-dried powder On the other hand, freeze-dried powder of acerola contained, oxalic, mallic, lactic, acetic and propionic.

Annona juice and its freeze-dried powder, had ascorbic acid content measured by HPLC recorded 6.93 and 27.85 mg/100gm respectively, the free radical scavenging activity clearly increased in freeze-dried annona powder compared to fresh juice. Total phenolic contents in fresh annona juice and its freeze-dried powder were (9.95 and 32.6 mg/100g) as gallic acid, respectively. Annona fresh juice contained seven organic acids compound and its freeze dried powder had five organic compounds. Red cactus juice and its freeze-dried powder had a high content from betacyanins, betaxanthis and total betalins comparing with yellow cactus juice and its freeze-dried powder and had a higher content of antioxidant activity 92% compared with yellow cactus juice 71.93%.

The rheological characteristics of fresh and reconstituted juices were measured for acerola, annona and cactus fruits at 25°C. The relationship between the applied shear rates and the corresponding shear

stress response was not linear indicating the non-Newtonian behavior of the juices obtained from these fruits. According to power law equation, the n-value (flow behavior index) of tested juices was in the range of 0.222 to 0.520 indicating the pseudoplastic behavior of the tested fruit juices. The highest values of consistency coefficient (K-value) were recorded for acerola juice (14.7 Dynes.s^n /cm^2), while the lowest values were recorded for the enzymatic treatment of red cactus juice (4.766 Dynes.s^n /cm^2). The rheological parameters of the reconstituted freeze dried juices showed that the n-values were in the range of 0.562 to 0.695, being higher than their corresponding n-values of the fresh juices. The highest values of consistency coefficient (K-value) of the reconstituted juices were recorded for yellow cactus while the lowest values were recorded for annona

The highest amount of absorbed moisture (0.3907g H_2O/g DM) was recorded for powders of yellow cactus juice due to its higher sugar content compared with the other tested powders. Sorption isotherms curves were analyzed according to the different sorption isotherms equation applied like: BET, Halsey, Smith, Oswin, Henderson and GAB-models.

On the other hand, the results showed that supplementation of strawberry jams with freeze dried tropical fruits powder during processing, enriched these products in bioactive compounds. Also, supplementation of jams with freeze dried powder of the treated fruits had a good effect on color and antioxidant activity. The strawberry jam made with freeze dried tropical fruits powder had a higher polyphenolic content and antioxidant activity. Therefore, this jam can be used as a good source of antioxidants in our diet and may have relevance in the prevention of diseases in which free radicals are implicated.

Keywords: Acerola, Cactus pear, Annona, Freeze drying, Rheology, Apparent viscosity, Antioxidant activity.

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CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AA%	:	Antioxidant activity
Abs	:	Absorbance
AOAC	:	Association of Official Analytical Chemists
β	:	Beta
°C	:	Centigrade degree
CAE	:	Catechin Equivalents
DPPH	:	2,2-diphenyl-1- picrylhydrazyl
et al	:	And other
FAO	:	Food and Agriculture Organization
FEV	:	Flow Expiratory Volume
Fig	:	Figure
GAE	:	Gallic Acid Equivalent
H_2O_2	:	Hydrogen Peroxide
HPLC	:	High Performance Liquid Chromatography
L	:	Litter
µg	:	Microgram
mg	:	mill gram
ml	:	Milliliter
NS	:	Non Significant
O.D	:	Optical Density
ORAC	:	Oxygen Radical Absorbance Capacity
PPs	:	Polyphenols
TPAC	:	Total Phenolic Acid Contents
TPC	:	Total Phenolic Contents