STUDIES ON CARBOHYDRATE INTOLERANCE IN SELECTED FOOD

By

HANAA GEORGE ISHAK ABDELMESEEH

B.Sc., Agric. (Food Technology), Fac. Agric., Ain Shams Univ., 2000

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This thesis for M.Sc. degree has been approved by:

Dr. Shahinaz Ahmed Helmy **……..……..**
Prof. of Food Science and Technology, Faculty of Agriculture, Cairo University

Dr. Mohamed Farag Khallaf **……..……..**
Prof. of Food Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Mohamed Abdalla El-Hofi **……..……..**
Prof. of Dairy Science and Technology, Faculty of Agriculture, Ain Shams University

Dr. Ihab Salah Abd El-Hamid Ashoush **……..……..**
Prof. of Food Science and Technology, Faculty of Agriculture, Ain Shams University

Date of Examination: / / 2018

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Under the supervision of:

Dr. Ihab Salah Abd El-Hamid Ashoush

Prof. of Food Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Mohamed Abdalla El-Hofi

Prof. of Dairy Science and Technology, Department of Food Science, Faculty of Agriculture, Ain Shams University

Dr. Sameh Samir Raafat Naguib

Associate Prof. of Cardiology, Department of Cardiology, Faculty of Medicine, Ain Shams University

ABSTRACT

Hanaa George Ishak Abdelmeseeh: "Studies on Carbohydrate Intolerance in Selected Food". Unpublished M.Sc. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2018.

Carbohydrate intolerance begins as a hidden problem; it can progress to a functional disorder producing symptoms like fatigue that negatively affects quality of life, and can gradually result in serious illness such as diabetes or heart disease. The aim of this work was the development and characterization of a functional beverage from wheatgrass extract (WGE), pomegranate juice (PJ), and lemon juice (LJ), also symbiotic dairy drink was developed. The final products were pasteurized and evaluated by the content of Total phenolic (TP), flavonoids (TF) content as well as free radical scavenging activity. Meanwhile, physicochemical properties and the organoleptic attributes were evaluated. Also, the protective effect of functional blending juice against carbohydrate intolerance in patients was investigated by hydrogen breath test. The results revealed that the WGE are low acidic in nature. While, the LJ showed high acidity which raised the total acidity in the functional blending juice. PJ had higher content of total phenolic (17.45 mg/ml) followed by (13.25 mg/ml) for functional blending juice. While, significant increase in the TF (22.15 mg /ml) in the Wheatgrass juice followed by functional blending juice (5.70 mg/ml). Whereas, the results showed that functional blending juice recorded the highest antioxidant activity, which revealed great free radical scavenging activity (98.16%). Depending on sensory evaluation, the proportions of blending ratio WGE 20: PJ 70: LJ 10 was most preferred for consumption by the panelists compared to other blending ratios. After one month for patients group treated by functional blending juice, showed a significant decrease in the concentration of hydrogen level in the exhalation air to reach a significant level of the control patients group, indicating the ability of the active compounds in functional blended juice to relieve the problems of

carbohydrate intolerance. Accordingly, healthy promoting drinks can be produced by adding mixture of pomegranate juice, lemon juice and wheatgrass juice. The obtained fermented milk drinks which fortified with 2% wheatgrass extract have a good sour taste, a unique flavor and a very pleasant smell. This product targets all categories of consumers and represents an ideal morning drink for those who are concerned about a carbohydrate disorder and healthy lifestyle.

Keywords: Wheatgrass, Pomegranate, Lemon, Fermented milk, Antioxidant activity, Carbohydrate intolerance, Hydrogen breath test.

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LIST OF ABBREVIATIONS

A.O.A.C.	:	Association of Official Analytical Chemistry
AA%	:	Antioxidant activity
Ab	:	Antibodies
Abs	:	Absorbance
ADP	:	Adenosine diphosphate
AFR	:	Adverse food reaction
Al	:	Aluminum
AlCl3	:	Aluminum chloride
ALP	:	Alkaline phosphatase
ALT	:	Alanine aminotransferase
ANOVA	:	Analysis of variance
Apo B	:	Apo B lipoprotein
AS	:	Allergic asthma
AST	:	Aspartate amino transferase
ATP	:	Adenosine triphosphate
B	:	Beta
BCP	:	Bromcresol purple
BMI	:	Body mass index
BPS	:	Bathophenanthroline disulfonate
BUN	:	Blood urea nitrogen
BW	:	Body weight
°C	:	Centigrade degree
Ca	:	Calcium
CAD	:	Coronary artery disease
CAE	:	Catechin equivalent
CBC	:	Complete Blood Count
CFU/ml	:	Colony-forming units per milliliter
CI	:	Carbohydrate intolerance
CMP	:	Casein macro peptides
Cr Cl	:	Creatinine clearance
DCA	:	Differential clostridia agar

DNA	:	Deoxyribonucleic acid
DPPH	:	2,2-diphenyl, l-picryl hydrazyl
ESR	:	Erythrocyte sedimentation rate
FAO	:	Food and agriculture organization
FBS	:	Fasting blood sugar
Fe	:	Ferric
Fig	:	Figure
FODMAP	:	Fermentable oligosaccharides, disaccharides, monosaccharides and polyols
FOS	:	Fructooligosaccahrides
G	:	Gram
g/L	:	Gram per liter
g/dl	:	Gram per deciliter
G-6-P	:	Glucose-6-phosphate
G-6-PD	:	Glucose-6-phosphate dehydrogenase
GAE	:	Gallic acid equivalent
GFR	:	Glomerular filtration rate
H_2	:	Hydrogen
H_2O_2	:	Hydrogen peroxide
HBA1c	:	Hemoglobin A1c
HBT	:	Hydrogen breath test
HDL	:	High density lipoprotein
HDL-C	:	High density lipoprotein cholesterol
HGB	:	Hemoglobin
HK	:	Hexokinase
$HO^{\bullet}$	:	Hydroxyl radical
HPLC	:	High performance liquid chromatography
IBS	:	Irritable bowel syndrome
IBW %	:	Ideal body weight percentage
Ig	:	Immunoglobulin
IgE	:	Immunoglobulin E
K	:	Potassium

kcal	:	Kilo calorie
KF	:	Kenner fecal agar
L	:	Liter
LA-5	:	*Lactobaillus acidophilus*
LDL	:	Low density lipoprotein
LDL-C	:	Low density lipoprotein cholesterol
LJ	:	Lemon juice
LSA	:	Laureyl sulphide agar
M	:	Mole
µg	:	Microgram
µL	:	Microliter
mg	:	Milligram
mg/dl	:	Milligram per deciliter
mg/ml	:	Milligram per milliliter
Mg	:	Magnesium
MIC	:	Minimum inhibitory concentration
Ml	:	Milliliter
ml/kg	:	Milliliter per kilogram
mm/Hg	:	Millimeter mercury
Mn	:	Manganese
MRS	:	De Man, Rogosa and Sharpe agar
MWLA	:	Modified wallerstein laboratory nutrient agar
Na	:	Sodium
NAD	:	Nicotinamide adenine dinucleotide
NADH	:	Reduced nicotinamide adenine dinucleotide
NAOH	:	Sodium hydroxide
ND	:	Not detected
NS	:	Non significant
O.D	:	Optical density
$O^{\bullet}_{2}{}^{-}$	:	Superoxide ion
OLED	:	Organic light-emitting diode
PJ	:	Pomegranate juice