PRODUCTION AND EVALUATION OF SOME FUNCTIONAL DAIRY FOODS FORTIFIED WITH NATURAL SOURCE OF MINERALS AND ANTIOXIDANTS

By

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B.Sc.Agric. Sc. (Dairy Sc. & Tech.), Ain shams University, 2012

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ABSTRACT

Aliaa Ali Abdel Aziz, studies on Production and evaluation of some functional dairy foods fortified with natural sources of minerals and antioxidants. Unpublished Master of Science Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2016.

The goals of this investigation were to improve the functional and sensory properties of some dairy products through fortification with different plant ingredients as source of some bio-active compounds such as minerals and antioxidants. The study was conducted in two parts, in the first part, date powder (as sugar substitute) and pomegranate juice were added in the base formula of frozen yoghurt as a source of bioactive components. Four treatments of frozen yoghurt were made by substituting the sugar added with 2, 4, 6 and 8% of date powder. Another four treatments of flavoured frozen yoghurt mixes were fortified with pomegranate juice at level 10, 20, 30 and 40%. Sucrose sugar was added to the control mix at ratio 15%. Changes in the physical, chemical and organoleptic properties of mixes and frozen products were investigated. Lactic acid bacteria were also examined in frozen products and followed during frozen storage. The proportional increase in the ratio of date powder added to the blend of frozen yoghurt had no significant effect on pH value, total solids and fat contents, while it caused gradual increase in the, ash, crude fibers, antioxidant and minerals (Fe, Mg, K and Cu) contents. Freezing point, overrun and melting resistance of functional frozen yoghurt with date powder were increased, while, specific gravity and weight per gallon values of frozen mix were gradually decreased. Fortification of frozen yoghurt blend with date powder as sugar substitute improved the viability of lactic acid bacteria in frozen product during frozen storage period and increased the acceptability of frozen yoghurt product.

In functional frozen yoghurt with pomegranate juice, increase in the ratio of added pomegranate juice to the blend of frozen yoghurt had no significant effect on total solids and fat contents, while caused a gradual increase in the acidity, antioxidant, mineral contents and overrun,

On the other hand, ash content, pH, specific gravity, weight per gallon, freezing point and melting resistance of frozen mix were gradually decreased. Addition the pomegranate juice in the frozen yoghurt blend caused slight decrease in viability of all lactic acid bacteria in frozen product during frozen storage period. Fortification the frozen yoghurt blend with pomegranate juice up to 30% increased the acceptability of frozen yoghurt product. It could be concluded that, date powder and pomegranate juice could be used as good source of antioxidants, fibers and minerals functional frozen yoghurt products and enhancing sensory, nutritional and functional properties.

In the second part, flavoured functional permeate beverage fortified with different ratio of various plant extracts (lemon, mint and moringa), and compared to control beverage (without extracts) were prepared. Carbonated permeate beverage fortified with mixed extract were also prepared. All type of beverage stored up to 2 weeks at 5oC. Ash, acidity, vitamin C, antioxidants and some minerals contents increased with increasing the rate added of lemon, mint and moringa extracts. All flavoured beverage expect moringa beverage were higher in total sensory score compared with control. Permeate beverage fortified with 3% lemon and mint extracts (1:1) ranked higher flavour scores than those of other treatments. Carbonation of flavoured permeate beverage had no significant effect on physiochemical properties of final product. While, sensory evaluation enhanced with carbonation of permeate beverage. It could be concluded that, different plant extract (lemon or mint and moringa) could be used either single or mixed as good source of minerals and vitamins for making new type flavoured permeate beverage for enhancing sensory, nutritional and functional values of this new product.

Key words: Frozen yoghurt, functional beverage, Date powder, pomegranate juice, Lemon, Mint, Moringa, Fortification.

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LIST OF ABBREVIATION

ABBREVIATION	Mean
AOAC	American Official Analysis Chemists
AA	Antioxidant Activity
AODF	Anti oxidant dietary fiber
API	Analytical Profile Index
BHT	Butylated hydroxyl toluene
BM	Banana Marmalade
CFU	Colony forming unit
Chem.	Chemistry
Clin.	Clinical
CMC	Sodium carboxy methyl cellulose
CWB	Chakka Whey Beverage
CCRD.	Central Composite Rotatable Design
DPPH	1,1-diphenyl-2-picryihydrazyl
DLMO	Dried Levaes of Moringa Oleifera
FRAP	Ferric reducing antioxidant capacity
FAO	Food and Agriculture Organization
Fig. (s)	Figure (s)
g.	Gram
GLM	General Linear Model
GMB	Germany Mannheim Boehringer
HPLC	High Performance liquid Chromotography
JAP	Jerusalem artichoke powder
Kg	Kilo gram
LAB	Lactic acid bacterial
Lb.	Lactobacillus
LDL	Low density lipoprotein cholesterol
MSNF	Milk Solids Not Fat
Mg	Milligram
Min	Minute
ml	Milliliter
MRS	De man Rogosa and Sharp
ME	Mint Extract
PJ	Pomegrenate juice
PC	Poly phenolic compounds content
pH	Hydrogen ion concentration,negative log