DOI :10.31357/fapsmst.2012.00439

DEVELOPMENT OF NUTRI BARS USING TRADITIONAL FOOD FORMULATION BASES

BY

SRIMATHI DHAMMIKA DHARMARATHNE

This thesis is submitted in partial fulfillment of the requirements for the degree of

Masters of Food Science and Technology,
Department of Food Science and Technology,
Faculty of Applied Sciences,
University of Sri Jayewardenepura
Sri Lanka

2012

Declaration

I do hereby, certify that this Dissertation does not incorporate without acknowledgement any material previously submitted for the Degree or Diploma in any University, and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text .

15.03.2014

Date

S. D. Dharmarathne

The undersigned, has supervised the dissertation entitled 'Development of Nutri bars using traditional food formulation bases' Presented by S. D. Dharmarathne, a candidate for the degree of Masters in Food Science and Technology, and I do hereby, certify that, in my opinion, it is worthy of submission for examination.

....

Date Signature

Supervisor

Professor Arthur Bamunuarachchi

(Emerites Professor,

University of Sri Jayewardenepura, Sri Lanka)

Consultant Food Scientist and Technologist,

Specialist Agri.Business,

Post Harvest and Food Processing Trainer

Chief of Group "ON SITE",

Consultancy, Training and Trade Systems

ACKNOWLEDGMENT

I would like to express my sincere appreciation and gratitude to my supervisor, Prof. Arthur Bamunuarachchi (Emeritus Professor, University of Sri Jayewardenepura, Sri Lanka) Consultant Food Scientist and Technologist, Specialist Agribusiness, Post Harvest and Food Processing Trainer Chief of Group "ON SITE", Consultancy, Training and Trade Systems. for his patience, time commitment, support, and guidance throughout my research and education. His guidance and support during these years and for the completion of this work are truly appreciated.

I would like to extend my gratitude to Prof. K.K.D.S. Ranaweera, Dr. Jagath Wansapala, Mrs. Rupika Perera and all lecturers in Food Science and Technology Department, words of encouragement, advice during product development, for always being there for me and for their willingness to always talk to me.

Very special thanks to staff of the Food Science and Technology Department for their help in the lab with proximate analysis.

I would like to extend my thanks to my friends and colleagues: for their support, good conversations, and friendship throughout these years.

I am greatly indebted in a special way to my brother, Sampath and his loving wife Kalani Ranaweera who gave me assistance and constant encouragement to accomplish this project.

I am greatly indebted in a special way to my parents for always telling me to never give up and keep on going, their support.

Thanks to my husband Palitha for his unconditional love, words of encouragement, support, and for always believing in me.

ABSTRACT

This project was designed to develop a nourishing Nutri bar with commercial value especially for school going children to meet their body development requirements.

Jackfruit *(Atrocarpus heterophyllus)* is one of the tropical underutilized fruits that has received less attention from the food industry. A large number of ripen fruits are wasted during the fruiting season

The nutri bars were prepared by mixing all the ingredients such as Roasted crushed jack seed, puffed rice, chopped dried grapes, chopped dates, roasted sesame seed and roasted crushed peanuts, followed by concentrating the mixture at 120^{O}C 15 minutes Meanwhile, nutri bar products were patted in a tray for about 2.5 cm thickness. After patting, the mixture was cooled to 60°C and fed in to a rectangular cutting mould and pressed to obtain bars, which was cut into even sized bars of 2.5 cm width, 1.5 cm height, and 6 cm in length. Bars were coated with cooking chocolate. Each bar of approximately 12 g was packed individually in triple laminating pouch. Prepared samples were subjected to sensory evaluation through 30 untrained panelists and best sample was selected by using MINITAB software and FRIEDMAN statistical analysis. The sample was labeled as 546 rated as the best.

Further Analyses were covered with the six proximate factors - moisture, protein, fat, ash, crude fiber and carbohydrate in nutri bars. Moisture was determined by the air-oven drying method, ash by muffle furnace dry ashing, crude fibre by Soxhlet method, crude protein by the Kjeldahl procedure, crude fat by Soxhlet extraction method and carbohydrate by calculation. All chemicals used were of analytical reagent grade and procured from reputed companies and used as such.

Moisture content, microbiological evaluation as well as peroxide value during storage under ambient (27^{O}C) and 4°C temperature conditions in a refrigerator were studied. Moisture content did not increase due to its good quality material. The peroxide value of the samples did not show changes during the period of storage. Therefore the shelf life of this product was 3 months and thereafter the product was degraded by auto oxidation reaction. No deteriorations observed within 3 months. Shelf life of the nutri bar stored under the room temperature was found to be 3 months (temperature 27 °C, R.H. 70-80%).

TABLES OF CONTENTS

CHAPTER 3: METERIALS AND METHODS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

ABBREVIATION AND SYMBOLS

mm – Millimeter

cm – Centimeter

°C - Unit of measurement for temperature

V - Volume of sodium thiosalphate for titration of the sample

V_0 - Volume of sodium thiosalphate for blank titra

M - Weight of the sample

T - Molarity of the thiosulphate solution

HCl - Hydrochloric acid

R.H. - Relative humidity

$ - Dollar

g - Gram

DE - Dextrose equivalent level

CHO - Carbohydrate

Wbef - Before weight of sample

Waft - After weight of sample

ACC - Aerobic colony count

ml - Milliliter

°F - Unit of measurement for temperature in Fahrenheit

DP – Dilution procedure

SPCA – Standed Plate Count Agar

MPN – Most Probable Number

YEDCA – Yeast Extract Dextrose Chloraphenochol Agar

CHAPTER 1

INTRODUCTION

Food bars are snacks of good sensory and nutritional characteristics due to their high carbohydrates, proteins, fats, and minerals contents. Snack foods such as potato chips, extruded products, chocolates bars available in the market cannot meet the requirement of a balanced diet. These are unhealthy offerings for the consumers especially school going children. Increasing demand from consumers for nutritious snacks, has provoked the food manufacturers to develop food bars that provide nutrition and convenience.

School-going children need nutritious foods due to their enhance body development requirements. Food consumed by them should be rich in vitamins, minerals and balanced major nutrients like carbohydrates, proteins and fats. The options available for the children to buy wholesome and nourishing food products are very limited. This gap needs to be filled by developing products that conform to emerging trends of nutraceutical and functional foods. The products that are developed by utilizing dried fruit, processed legumes, and cereals along with nuts would be an attractive snack food for the school going children and for those people working outside their homes and are becoming more dependent on snacks for the supply of part of their daily nutritional requirements. At the moment, the imported fruit bars are available at super stores only in the big cities. The market price for these bars is exorbitant. This price is out of reach for target children (low and middle income families). In principle, the cost of indigenously developed product should be low which will suit the target consumer.

Nutri bars are food items meant to be consumed in a quick sitting, or on the go. They contain a wide range of vital nutrients and vitamins, as well as sufficient protein and carbohydrates to keep the body functioning. Depending on the purpose, nutri bars may focus on protein and maximize carbohydrates, or attempt to act more as a complete meal, with a higher caloric load. Generally, nutri bars are significantly flavored usually sweetened, to make them more appetizing to people, often making them very similar to baked goods or sweets.