

**DEVELOPMENT OF BISCUITS USING COMPOSITE FLOUR
OF WHEAT, FINGER MILLET AND LASIA SPINOSE
ENRICHED WITH GARLIC FLAVOR**



BY

A.M.Y.P.J. ADHIKARI



FTC 17



Project Report
Library - EUSL

DEPARTMENT OF BIOSYSTEMS TECHNOLOGY

FACULTY OF TECHNOLOGY

EASTERN UNIVERSITY

SRI LANKA

2021

ABSTRACT

Nutrient deficiencies such as protein, energy, and malnutrition and micronutrient deficiency are major problems especially among children in developing countries including Sri Lanka. This study was aimed to development of biscuits using composite flour of wheat, Finger millet and *Lasia spinose* enriched with Garlic flavor.

Finger millet flour in the level of 10%, 20%, 30%, 40% were mixed with 40%, 30%, 20%, 10% of *Lasia spinose* flour and constant amount of garlic powder was added to the same amount of wheat flour (50 %) for making the composite flour and biscuits were prepared. Biscuits prepared from 100% of wheat flour were used as control treatment. Treatments for biscuits prepared from composite flour vz .T1-100% wheat flour, T2- 50% wheat flour +10% Finger millet + 40% *Lasia spinose*, T3- 50% wheat flour + 20% Finfer miller + 30% *Lasia spinose*, T4- 50% wheat flour + 30% Finger millet + 20% *Lasia spinose*, T5 – 50% wheat flour + 40% Finger millet + 10% *Lasia spinose* and constant amount of garlic powder were added to each treatment .These treatments were subjected to analysis of Physical, Nutritional and Organoleptic Qualities to evaluate the suitability of these biscuits for consumption. Physical properties vz: diameter, thickness, and spread ratio Nutritional qualities vz-moisture, ash, protein, fat and were analyzed using the recommended standard AOAC methods. Analysis were carried out for the 3 replicates of each treatments. Organoleptic qualities were evaluated using a sensory panel consisting 30 semi trained panelists. The color, texture, taste, flavor and overall acceptability were evaluated using a seven point hedonic scale. Results of the nutritional and organoleptic

qualities were analyzed statistically by ANOVA using computer aided mini tab statically analysis package.

The physical properties of biscuits revealed that there were no significant differences between the treatments of biscuits. Nutritional analysis of the freshly prepared biscuits revealed that protein, and ash were increased from 4.82-5.76% and 0.71-0.85% respectively while moisture content and protein was decreased from 2.49-0.23% and 8.11-6.37% when increasing the finger millet flour 10%-40% in the biscuits mixture. From the overall acceptability rating, the biscuits sample prepared from composite flour with 50% wheat, 20% finger millet and 30% *lasia spinose* enriched with garlic flavor had the highest mean value compared with other treatments. Based on the nutritional and organoleptic qualities. Therefore, it can be concluded that the biscuits prepared from the composite flour with 50% wheat flour, 20% finger millet flour and 30% *Lasia spinose* flour enriched with garlic flavor was the best treatment compared to other combination.

TABLE OF CONTENTS

	Page No
Abstract	i
Acknowledgement	iii
Table of contents	iv
List of Tables	x
List of Figures	xi
List of Plates	xii
CHAPTER 01 – Introduction	1
CHAPTER 02 – Literature Review	4
2.1 Biscuits.....	4
2.1.1 Ingredients used for making biscuits.....	5
2.1.1.1. Flour.....	5
2.1.1.2. Sugar.....	5
2.1.1.3. Egg.....	6
2.1.1.4. Fat.....	6
2.1.1.5. Baking Powder.....	7
2.1.2 Baking of biscuits.....	7

2.1.3 Making cookies.....	7
2.2 Composite flour.....	8
2.3 Wheat flour.....	9
2.4 Finger millet flour.....	9
2.4.1 Taxonomy.....	9
2.4.2 Morphological Description.....	10
2.4.3 Origin and Domestication.....	10
2.4.4 Uses and health benefits of finger millet.....	11
2.5 Lasia spinose flour.....	12
2.5.1 Taxonomy.....	12
2.5.2 Origin and Distribution.....	13
2.5.3 Description about the plant.....	13
2.5.4 Nutritive value of Lasia spinose	14
2.6 Garlic Powder.....	14
2.6.1 Taxonomy.....	14
2.6.2 Origin and Distribution.....	15

2.6.3 Description about the plant.....	16
2.6.4 Nutritive value of garlic.....	17
2.7 Sensory evaluation.....	17
2.8 Panel management.....	18
2.9 Hedonic rating test.....	19
2.10 Benefits of sensory evaluation.....	19
2.11 Rules of sensory evaluation.....	20
2.12 Qualities assessed by sensory test.....	20
2.12.1 Colour.....	20
2.12.2 Flavor.....	20
2.12.3 Taste.....	20
2.12.4 Texture.....	21
2.12.5 Overall acceptability.....	21
CHAPTER 03- Materials and Method.....	22
3.1 Materials.....	22
3.1.1 Material used.....	22
3.1.2 Collection of materials.....	23

3.2 Methodology.....	23
3.2.1 Preparation of raw materials.....	23
3.2.1.1 Preparation of wheat flour.....	23
3.2.1.2 Preparation of Finger millet flour.....	23
3.2.1.3 Preparation of Lasia spinose flour.....	23
3.2.1.4 Preparation of garlic powder.....	24
3.2.2 Development of biscuits.....	25
3.2.2.1 Treatments.....	27
3.3 Nutritional analysis of biscuits.....	28
3.3.1 Determination of moisture content.....	28
3.3.2 Determination of ash content.....	30
3.3.3 Determination of protein content.....	31
3.3.4 Determination of Fat content.....	31
3.4 Physical properties analysis of biscuits.....	33
3.4.1 Diameter.....	33
3.4.2 Thickness.....	33
3.4.3 Volume.....	33
3.4.4 Density.....	33

3.4.5 Spread ratio.....	33
3.5 Organoleptic analysis.....	33
3.5.1 Materials used for organoleptic analysis.....	34
3.5.2 Cording of samples.....	36
3.5.3 Serving the sample for organoleptic analysis.....	37
3.6 Statically analysis	37
CHAPTER 04- Results and Discussion	38
4.1 Nutritional analysis of freshly made biscuits prepared from composite Flour of wheat, finger millet and Lasia spinose enrich with garlic flavor.....	38
4.1.1 Fat content.....	39
4.1.2 Protein content.....	39
4.1.3 Ash content.....	40
4.1.4 Moisture content.....	41
4.2 Physical property analysis of freshly made biscuits prepared from Composite flour of wheat, finger millet and Lasia spinose enrich With garlic flavor.....	42
4.2.1 Diameter.....	43
4.2.2 Thickness.....	43

4.2.3 Spread ratio.....	43
4.3 Organoleptic qualities analysis of freshly made biscuits prepared	
From composite flour of wheat, finger millet and Lasia spinose enrich	
With garlic flavor.....	44
4.3.1 Colour.....	45
4.3.2 Taste.....	45
4.3.3 Texture.....	46
4.3.4 Flavor.....	47
4.3.5 Overall acceptability.....	48
CHAPTRE 05- Conclusion	49
CHAPTRE 06.....	52

LIST OF TABLES

	Page No
Table 3.1: Ingredients for the formulation of biscuits.....	25
Table 3.2: Treatment.....	27
Table 4.1: Nutritional analysis of freshly made biscuits prepared from composite flour of wheat, finger millet and <i>Lasia spinose</i> enrich garlic Flavor.....	38
Table 4.2 Physical property analysis of freshly made biscuits prepared from Composite flour of wheat, finger millet and <i>Lasia spinose</i> enrich garlic flavor.....	42
Table 4.3 Sensory evaluation of freshly made biscuits prepared from composite flour of wheat, finger millet and <i>Lasia spinose</i> enrich with garlic Flavor.....	44

LIST OF FIGURES

	Page No
Figure 3.1: Flow hart for production of <i>Lasia spinose</i> , Finger millet flour And Garlic powder.....	24
Figure 3.2: Flow hart for development of biscuits.....	26
Figure 4.1: Fat content of freshly made biscuits	39
Figure 4.2: Protein content of freshly made biscuits.....	39
Figure 4.3: Ash content of freshly made biscuits.....	40
Figure 4.4: Moisture content of freshly made biscuits.....	41
Figure 4.5: color of freshly made biscuits from wheat, finger millet an <i>Lasia spinose</i> enrich with garlic flavor.....	45
Figure 4.6: Taste of freshly made biscuits prepared from wheat, finger millet and <i>Lasia spinose</i> enrich with garlic flavor.....	46
Figure 4.7: Texture of freshly made biscuits prepared from wheat, finger millet and <i>Lasia spinose</i> enrich with garlic flavor.....	47
Figure 4.8: Flavor of freshly made biscuits prepared from wheat, finger millet and <i>Lasia spinose</i> enrich with garlic flavor.....	48
Figure 4.9: Overall aeptability made biscuits prepared from wheat, finger millet and <i>Lasia spinose</i> enrich with garlic flavor.....	48

LIST OF PLATES

	Page No
Plate 3.1: Finger millet flour, <i>Lasia spinose</i> flour, wheat flour.....	25
Plate 3.2: Prepared biscuits.....	27
Plate 3.2: Sensory evaluation of EUSL Bio System Lab.....	35
Plate 3.4: The code number denoted the sample	36