PHYSICAL AND ANTIOXIDANT PROPERTIES OF CASSAVA-BASED RICE ANALOGUE

by

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS iii

TABLE OF CONTENTS iv

LIST OF TABLES vii

LIST OF FIGURES viii

LIST OF ABBREVIATIONS viii

ABSTRAK x

ABSTRACT ix

CHAPTER 1 INTRODUCTION 1

1.1 Research Background 1

1.2 Rationale of the Study 4

1.3 Objectives 5

CHAPTER 2 LITERATURE REVIEW 6

2.1 Cassava-Based Rice Analogue 6

2.2 Ingredients of Cassava-Based Rice Analogue 9

2.2.1 Modified Cassava Flour (MOCAF) 9

2.2.2 Rice Flour 10

2.2.3 Cassava Leaves Flour 12

2.3 Cassava Plant 13

2.3.1 Cassava Roots 14

2.3.2 Cassava Leaves 15

2.4 Toxicity of Cassava 16

2.4.1 Cyanide detoxification in cassava 18

2.5 Antioxidants Properties in Foods for Human Consumption 21

CHAPTER 3 MATERIALS AND METHODS 23

3.1 Raw materials 23

3.2 Reagents and chemicals 23

3.3 Equipment 24

3.4 Formulation of Cassava-Based Rice Analogue 25

3.4.1 Preparation of Rice Flour 27

3.4.2 Preparation of Modified Cassava Flour 27

3.4.3 Preparation of Cassava Leaves Flour 27

3.4.4 Preparation of Cassava-Based Rice Analogue 28

3.5 Extraction of Bioactive Compounds 28

3.6 Physical Analysis 29

3.6.1 Colour 29

3.7 Chemical Analysis 29

3.7.1 Total Phenolic Content 29

3.7.2 DPPH Free Radical Scavenging Assay 30

3.7.3 Ferric Reducing Antioxidant Power Assay (FRAP) 30

3.7.4 Total Tannin Content 31

3.7.5 Total Chlorophyll Content 31

3.8 Statistical analysis 32

CHAPTER 4 RESULTS AND DISCUSSION 33

4.1 Characteristics of MOCAF and Cassava Leaves Flour 33

4.2 Characteristics of Cassava Based Rice Analogues 36

4.3 Physical analysis 38

4.3.1 Colour 38

4.4 Chemical analysis 43

4.4.1 Total Phenolic Content 43

4.4.2 DPPH Free Radical Scavenging Activity 46

4.4.3 FRAP Free Radical Scavenging Activity 47

4.4.4 Total Tannin Content 50

4.4.5 Total Chlorophyll Content 52

4.4.6 Correlation coefficient between variables 55

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS 57

5.1 Conclusion 57

5.2 Recommendations 58

REFERENCES 59

LIST OF TABLES

Table	Caption	Page
3.1	Formulation of cassava-based rice analogue on dry weight basis.	26
4.1	Lightness of cassava-based rice analogue with different substitution ratio of RF with MOCAF and percentage of cassava leaves.	39
4.2	Redness of cassava-based rice analogue with different substitution ratio of RF with MOCAF and percentage of cassava leaves.	40
4.3	Yellowness of cassava-based rice analogue with different substitution ratio of RF with MOCAF and percentage of cassava leaves.	41
4.4	Pearson correlation coefficient among response variables.	55

LIST OF FIGURES

Figure caption		Page
2.1	Various types of rice analogues (Valencia et al., 2020).	8
2.2	Cassava plantation (Byju and Suja, 2020).	13
2.3	Cassava roots (Muimba-Kankolongo, 2018).	14
2.4	Molecular structures of linamarin and lotaustralin and hydrolysis of linamarin (Yeoh et al., 1998).	17
2.5	Processing methods of cassava roots (Montagnac et al., 2009b).	18
3.1	Processing of Cassava-Based Rice Analogue.	25
4.1	Modified cassava flour (MOCAF).	33
4.2	Cassava leaves flour.	34
4.3	Cassava-based rice analogue before and after drying.	35
4.4	Characteristics of cassava-based rice analogues.	36
4.5	Standard Curve of Gallic Acid.	43
4.6	Total phenolic content of cassava-based rice analogue with different substitution ratio of RF with MOCAF and different percentage of percentage of cassava leaves.	44
4.7	DPPH scavenging activities of cassava-based rice analogue with different substitution of RF with MOCAF and different percentage of percentage of cassava leaves.	46
4.8	FRAP scavenging activities of cassava-based rice analogue with different substitution of RF with MOCAF and different percentage of percentage of cassava leaves.	48
4.9	Total tannin content of cassava-based rice analogue with different substitution of RF with MOCAF and different percentage of percentage of cassava leaves	51
4.10	Total chlorophyll content of cassava-based rice analogue with different substitution of RF with MOCAF and different percentage of percentage of cassava leaves.	53

LIST OF ABBREVIATIONS

Abbreviation	Caption
RF	Rice Flour
MOCAF	Modified Cassava Flour
HCN	Hydrogen Cyanide
TPC	Total Phenolic Content
DPPH	2,2-diphenyl-1-(2,4,6-triniytrophenyl)hydrazyl
FRAP	Ferric Reducing Antioxidant Power
TTC	Total Tannin Content
TCC	Total Chlorophyll Content
GAE	Gallic Acid Equivalents
CL	Control
RAF	Rice Analogue Formulation
ANOVA	Analysis of Variance

SIFAT ANTIOKSIDAN ANALOG BERAS BERASASKAN UBI KAYU

ABSTRAK

Analog beras berasaskan ubi kayu adalah sejenis beras buatan yang dibuat daripada komponen ubi kayu yang dapat digunakan sebagai makanan alternatif yang sihat untuk dimakan setiap hari kerana nutrien berkualiti tinggi dan sifat bermanfaat tertentu yang bermanfaat untuk kesihatan seseorang. Pengguna kini beralih ke pilihan makanan yang lebih sihat kerana peningkatan penyakit tidak berjangkit dan tabiat makan yang tidak sihat tetapi produk beras semasa di pasaran masih tidak memberikan pelbagai pilihan untuk memenuhi keperluan pengguna. Penyelidikan ini bertujuan untuk mengkaji sifat fizikal dan antioksidan analog beras berasaskan ubi kayu berdasarkan nisbah penggantian RF yang berbeza dengan MOCAF (100:0, 70:30, 50:50, 30:70, dan 0:100) dan pelbagai penambahan daun ubi kayu (0 %, 10 %, dan 20 %). Warna, jumlah kandungan fenolik (TPC), aktiviti pembersihan DPPH dan FRAP, kandungan tanin total (TTC) dan kandungan klorofil total (TCC) semuanya dianalisis. Hasil yang diperoleh menunjukkan bahawa penggantian RF dengan MOCAF dan penambahan daun mempunyai pengaruh terhadap sifat fizikal dan antioksidan pada RAF. Rumusan terbaik adalah RAF 12 (100 % MOCAF dan 20% daun ubi kayu) kerana TPC tertinggi (198.8 mg GAE/100 g sampel), perencatan DPPH (79 %), perencatan FRAP (85 %), TTC (198 mg GAE/100 g sampel) dan TCC (198 mg/ml). Semua pemboleh ubah mempunyai korelasi Pearson tinggi linear dan positif yang signifikan. Apabila lebih banyak daun ditambahkan, kecerahan analog padi menurun dengan ketara dari 76.02 hingga 38.34, dan analog padi menjadi lebih hijau kerana peningkatan TCC (2 mg/ml hingga 198 mg/ml), tetapi peratusan daun ubi kayu lebih tinggi (20 %) mengakibatkan penurunan kekuningan (22.12 hingga 19.86). Kesimpulannya, penggantian MOCAF dan penambahan daun

ubi kayu di dalam analog beras berasaskan kayu meningkatkan sifat antioksidan dan meningkatkan potensinya sebagai makanan alternatif yang sihat untuk manusia.

ANTIOXIDANT PROPERTIES OF CASSAVA-BASED RICE ANALOGUE

ABSTRACT

Cassava-based rice analogue is a type of artificial rice made from cassava components that may be used as a healthy alternative diet for daily consumption due to high-quality nutrients and specific helpful properties that are beneficial to one's health. Consumers have now shifted toward healthier food options due to the rise in non-communicable diseases and unhealthy eating habits, but the current rice products on the market still do not provide a wide variety of choices to meet consumer needs. This research aims to study the physical and antioxidant properties of cassava-based rice analogue based on different substitution ratios of rice flour (RF) with modified cassava flour (MOCAF) which were 100:0, 70:30, 50:50, 30:70, and 0:100 followed with varied additions of cassava leaves flour (0 %, 10 %, and 20 %). Colour, total phenolic content (TPC), DPPH and FRAP scavenging activities, total tannin content (TTC) and total chlorophyll content (TCC) were all analysed. The result obtained showed that the substitution of RF with MOCAF and the addition of leaves had an effect on the physical and antioxidant properties in rice analogue formulation (RAF). The best formulation was RAF 12 (100 % MOCAF and 20 % cassava leaves) due to the highest TPC (198.8 mg GAE/100 g sample), DPPH inhibition (79 %), FRAP inhibition (85 %), TTC (198 mg GAE/100 g sample) and TCC (198 mg/ml). All of the responding variables had a significant linear and positive high Pearson's correlations. As more leaves were added, the lightness of the rice analogue decreased significantly from 76.02 to 38.34, and the rice analogue became greener due to increased TCC (2 mg/ml to 198 mg/ml), but higher percentage of cassava leaves (20 %) resulted in reduced yellowness (22.12 to 19.86). In conclusion, MOCAF substitution and cassava leaf addition into cassava-based rice analogues improved the

antioxidant properties and increase their potential as a healthy alternative diet for humans.