



**DEVELOPMENT OF CASSAVA-BASED RICE  
ANALOGUE AND THE STUDY ON ITS  
PHYSICOCHEMICAL PROPERTIES**

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of  
Bachelor of Technology (B.Tech) in the field of Food Technology  
School of Industrial Technology  
Universiti Sains Malaysia

June 2021



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Sekian, terima kasih.

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*chiewyen*

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JUNE 2021

## **ACKNOWLEDGEMENTS**

First and foremost, I would like to express my gratitude and appreciation to my supervisor, Prof Fazilah binti Ariffin for her guidance, assistance and constant support at every stage of the research project. I greatly appreciate her valuable time and advice in helping me for improvement and always willing to solve my inquiry.

Secondly, I would like to take this opportunity to express my sincere thanks to the postgraduate student, Ms Syazana for her time and effort in helping me throughout the working of final year project. I appreciate her help during the working of laboratory work and also her advice to me for better improvement.

I would also like express my sincere thanks to all of the laboratory technicians especially Mdm Norita Abdul Kadir, Mr Maarof Salleh, Mr. Abdul Rahim Md. Sari, Mr Abdul Ghoni Ruslan, Mr. Mohamad Firdaus Mohd Adnan for their help by providing all the chemicals, apparatus and equipment throughout this final year project.

Lastly, I also appreciate all the support I received from my family and my fellow course mates.

LIU CHIEW YEN

JUNE 2021

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## LIST OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Captions</b>
<b>ANOVA</b>	Analysis of Variance
<b>a*</b>	Redness
<b>b*</b>	Yellowness
<b>h</b>	Hour
<b>L*</b>	Brightness
<b>min</b>	Minute
<b>MOCAF</b>	Modified cassava flour
<b>N</b>	Newton
<b>RAF</b>	Rice analogue formulation
<b>s</b>	Second
<b>UV-vis</b>	Ultraviolet-visible

## LIST OF SYMBOLS

Symbols	Caption
%	Percentage
±	Plus-minus sign
°C	Degree Celsius
<	Less than

# **PEMBANGUNAN ANALOG BERAS BERDASARKAN UBI KAYU DAN KAJIAN MENGENAI FISIKOKIMIANYA**

## **ABSTRAK**

Analog beras telah dikembangkan sebagai salah satu sumber karbohidrat makanan ruji. Ia dihasilkan dari sumber karbohidrat bukan padi seperti ubi kayu, jagung dan sorgum. Nasi putih komersial kaya dengan karbohidrat tetapi ia rendah dalam protein, serat dan mineral penting. Ia didapati berkaitan dengan pengembangan diabetes Jenis 2. Kajian ini bertujuan untuk mengembangkan analog beras berasaskan ubi kayu yang dapat berfungsi sebagai pilihan alternatif untuk beras komersial. Pengaruh perbandingan tepung ubi kayu yang dimodifikasi kepada tepung beras dan peratusan daun ubi kayu terhadap sifat fizikokimia analog beras berasaskan ubi kayu akan dikaji. Sampel akan dianalisis berdasarkan komposisi proksimat, kandungan amilosa, kandungan sianida, profil tekstur, warna, daya bengkak, keupayaan penyerapan air dan morfologi. Hasil kajian menunjukkan bahawa kedua-dua factor menunjukkan pengaruh yang signifikan terhadap sifat fizikokimia analog beras berasaskan ubi kayu. Kajian menunjukkan bahawa RAF 2 (analog beras ubi kayu yang diformulasikan dengan 50 % tepung ubi kayu) dengan tambahan 20 % daun ubi kayu memiliki sifat yang paling diinginkan dari segi komposisi proksimat, kandungan amilosa dan sifat fungsi. Berbanding dengan kawalan, ia menunjukkan nutrient yang lebih baik dari segi kadar protein ( $10.91 \pm 0.59$  %), serat ( $2.14 \pm 0.11$  %) dan amilosa ( $27.48 \pm 0.76$  %) yang tinggi. Ia juga mempunyai sifat berfungsi yang lebih baik and tekstur menyerupai dengan kawalan. Dari aspek keselamatan, kandungan sianida ( $2.65 \pm 0$  ppm) juga memenuhi syarat oleh WHO dan ia adalah selamat untuk dimakan. Sebagai kesimpulan, analog beras yang dikembangkan menggunakan ubi kayu dan daun ubi kayu dapat bertindak sebagai alternatif yang lebih sihat daripada beras putih komersial.

# **DEVELOPMENT OF CASSAVA-BASED RICE ANALOGUE AND THE STUDY ON ITS PHYSICOCHEMICAL PROPERTIES**

## **ABSTRACT**

Rice analogue has been developed as one of the carbohydrate sources of staple food. It is made from non-paddy carbohydrate source such as cassava, corn and sorghum. Commercial white rice is rich in carbohydrate while low in protein, fiber and other essential minerals and it is found to associate with Type 2 diabetes. Therefore, this study was aimed to develop cassava-based rice analogue which can act as healthier alternative to commercial white rice. The effect of ratio of modified cassava flour to rice flour and percentage of cassava leaves on the physicochemical properties of cassava-based rice analogue was studied. Samples developed were analyzed based on proximate composition, amylose content, cyanide content, texture profile analysis, colour, swelling power, water absorption capacity and morphology. Results showed that both ratio of modified cassava flour to rice flour and percentage of cassava leaves addition had significant effect on the physicochemical properties of cassava-based rice analogue. It was found that RAF 2 (rice analogue formulated with 5:5 in term of ratio of modified cassava flour to rice flour) fortified with 20 % cassava leaves possessed the most desirable properties in term of proximate composition, amylose content and functional properties. It demonstrated better nutrition in term of high level in protein ( $10.91 \pm 0.59$  %), fiber ( $2.14 \pm 0.11$  %) and amylose content ( $27.48 \pm 0.76$  %). It also possessed better functional properties in term of swelling power and water absorption capacity and its texture was resembled to control (rice flour). In term of safety aspect, cyanide content ( $2.65 \pm 0$  ppm) was also fulfilled the requirements by WHO indicates that it is safe to be consumed. In a conclusion, rice analogue developed using both cassava roots and leaves can act as healthier alternative to commercial white rice.