THE USE OF AQUAFABA, PLANT PROTEIN ISOLATE AND SOY LECITHIN TO REPLACE EGG IN KUIH BAHULU

ROSMIZA BINTI ABD RAHMAN

UNIVERSITI SAINS MALAYSIA

JULY 2020

PUSAT PENGAJIAN TEKNOLOGI INDUSTRI

UNIVERSITI SAINS MALAYSIA

BORANG PENYERAHAN DISERTASI MUTAKHIR

SATU (1) NASKAH

Nama penyelia: Prof. Dato' Dr. Azhar Mat Easa

Bahagian: Teknologi Makanan

Saya telah menyemak semua pembetulan / pindaan yang dilaksanakan oleh Encik/Puan/Cik: Rosmiza Binti Abd Rahman mengenai disertasinya sebagaimana yang dipersetujui oleh Panel Pemeriksa di Viva Voce-nya.

2. Saya ingin mengesahkan bahawa saya berpuas hati dengan pembetulan / pindaan yang dilaksanakan oleh calon.

Sekian, terima kasih.

_____ 8 OGOS 2020

(Tandatangan dan cop) (Tarikh)

THE USE OF AQUAFABA, PLANT PROTEIN ISOLATE AND SOY LECITHIN TO REPLACE EGG IN KUIH BAHULU

by

ROSMIZA BINTI ABD RAHMAN

A dissertation submitted in partial fulfilment 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

July 2020

DECLARATION BY AUTHOR

This dissertation is composed of my original work and contains no material previously published or written by another person except where due reference has been made in the text. The content of my dissertation is the result of work I have carried out sine the commencement of my research project and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution.

ROSMIZA BINTI ABD RAHMAN

JULY 2020

ACKNOWLEDGEMENT

As the completion of this research work gave me much pleasure, I had to take the help and guidance of some respected persons, who deserve my deepest gratitude, especially to my final year project supervisor, Professor Dato' Dr. Azhar Mat Easa for numerous consultations, guidance and give me an inspiration to improve the quality of the research project.

Appreciation to School of Industrial Technology for let me to use the available facilities throughout my research project, including to external guide which are laboratory assistants especially to En. Rahim, En. Firdaus and Miss Ann, for giving me a good guideline and help me in handling of laboratory equipment and apparatus.

I am using this opportunity to express my gratitude to all those who have directly and indirectly guided and supported me throughout this research project including my course mates and the postgraduates, I am thankful for their aspiring guidance, invaluably constructive criticism, friendly advice by sharing their truthful and illuminating views on several issues related to the research project.

Finally, I would like to thank my family members for their encouragement and moral support during my research study. I am sincerely grateful to them for.

ROSMIZA BINTI ABD RAHMAN

JULY 2020

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviations	Caption
ANOVA	Analysis of Variance
AACC	Association for Clinical Chemistry
AQ	Aquafaba
C*	Chroma
^{o}C	Degree Celcius
Df	Degree of freedom
g	Gram
h^{o}	Hue
L*	Lightness
min	Minute
mL	Milimeter
PAS	Plant Protein Isolate, Aquafaba, Soy Lecithin
PPI	Plant Protein Isolate
SL	Soy Lecithin

LIST OF SYMBOLS

Symbol	Caption
x	Multiply
%	Percentage
±	Plus-minus

LIST OF APPENDICES

PENGGUNAAN AQUAFABA, TUMBUHAN PROTEIN ASING DAN SOYA LESITIN UNTUK MENGGANTIKAN TELUR DALAM KUIH BAHULU

ABSTRAK

Telur adalah salah satu bahan utama dalam menghasilkan *kuih bahulu* kerana sifat fungsinya yang sangat baik, tetapi terdapat beberapa masalah iaitu alergi dan vegan. Oleh itu, ia memberi impak kepada industri makanan terutama industri makanan tempatan untuk mencari pengganti telur yang sesuai. Dalam kajian ini, bahan-bahan yang berbeza (aquafaba, tumbuhan protein asing dan soya lesitin) digunakan dengan tahap dan kombinasi yang berbeza pada sampel seperti AQ, PPI, AQ dan PPI, dan terakhir sampel PAS untuk menggantikan telur dalam menghasilkan kuih bahulu untuk mengkaji kesannya terhadap kualiti dan fizikal kuih bahulu. Ujian tentang penampilan, isipadu spesifik, warna dan tekstur termasuk kekerasan, kekenyalan dan keanjalan dilakukan pada semua sampel. Penampilan dari segi saiz dan warna diperhatikan dan hasilnya sampel dengan SL hampir sama dengan sampel kawalan. Kebanyakan hasil daripada analisis menunjukan terdapat perubahan yang signifikasi ($P < 0.05$) terhadap sampel kawalan dan sampel PAS iaitu analysis isipadu spesifik, warna kerak pada L* dan h^o, warna isi sampel pada h^o dan tekstur kekerasan. Namun begitu, sampel PAS kelihatan lebih sama dengan sampel kawalan dan sampel dengan PAS kelihatan lebih bagus dibandingkan dengan sampel kawalan dari segi tekstur. Walau bagaimanapun, sukar untuk menghasilkan kuih bahulu bebas telur kerana fungsi yang bagus dari telur dan kajian hadapan diperlukan bagi mencari kombinasi tumbuhan yang sesuai bagi mengantikan telur.

THE USE OF AQUAFABA, PLANT PROTEIN ISOLATE AND SOY LECITHIN TO REPLACE EGG IN KUIH BAHULU

ABSTRACT

Egg is a one of the main ingredients in producing *kuih bahulu* due to the excellent functional properties, but there are popping up some problem prone to the allergies and vegan. Thus, give an impact to the food industry especially local food industry to find the suitable substitution for the egg. In this study, different ingredients (aquafaba, plant protein isolate and soy lecithin) were used with different combination in sample such as AQ, PPI, AQ and PPI, and lastly PAS to replace egg in producing *kuih bahulu* to study the effect on physical quality of *kuih bahulu*. Test on the appearance, specific volume, crust and crumb colour and texture including hardness, chewiness and springiness were performed on all samples. Appearance in terms of size and colour were observed and showed that the sample with SL was almost like the control sample. Most of the analysis result showed that there were significant different ($P < 0.05$) between control sample and PAS sample in terms of specific volume, L* and h^o for the crust colour, h^o for the crumb colour and hardness of sample texture. However, the PAS was almost similar to the control sample and sample with PAS was much better compared to control sample in terms of texture. However, it is possible to make egg-free *kuih bahulu* due to the excellent functional properties of egg, and the further research on the combination of plant-based ingredients to replace egg is required.