

CONTENTS

Page

ABSTRACT IN THAI.....	I
ABSTRACT IN ENGLIST.....	III
ACKNOWLEDGMENTS.....	V
CONTENTS.....	VI
LIST OF TABLE.....	X
LIST OF FIGURE.....	XII
LIST OF ABBREVIATIONS.....	XIII
CHAPTER	
INTRODUCTION.....	1
1.1 Significant of the study.....	1
1.2 Research objectives.....	2
1.3 Research hypothesis.....	2
1.4 Scope of the study.....	2
1.5 Expected results.....	2
1.6 Reference.....	3
LITERATURE REVIEWS.....	5
2.1 Diabetes Mellitus (DM).....	5
2.2 Obesity.....	6
2.3 Insulin signaling.....	6
2.4 Insulin resistance.....	7
2.5 Hepatic steatosis.....	8
2.6 Cafeteria diet (CAF).....	9
2.7 Pancreatic α -amylase.....	9
2.8 White kidney bean (<i>Phaseolus vulgaris</i>).....	10

CONTENTS (Continued)

	Page
2.9 Effect of white bean extract on vivo	11
2.10 Reference.....	15
UNVEILING OPTIMAL EXTRACTION CONDITIONS FOR POTENT ALPHA-AMYLASE INHIBITORS FROM WHITE KIDNEY BEANS	20
3.1 Abstract	20
3.2 Introduction.....	20
3.3 Material and Methods	21
3.3.1 Sample preparation	21
3.3.2 Proximate analysis.....	21
3.3.2.1 Moisture (AOAC 925.10)	21
3.3.2.2 Ash (AOAC 900.02A)	22
3.3.2.3 Sand (AOAC 900.02D)	22
3.3.2.4 Crude fat (AOAC 945.16).....	23
3.3.2.5 Crude fiber (AOAC 978.10).....	23
3.3.2.6 Crude protein (AOAC 928.08).....	24
3.3.3 White kidney bean extraction.....	25
3.3.4 Protein concentration.....	25
3.3.5 Specific α -amylase inhibitory activity measurement	25
3.3.6 Experimental design	26
3.4 Results and Discussion	27
3.4.1 Proximate analysis results	27
3.4.2 Optimization of bean extraction conditions.....	27
3.4 Conclusion	31
3.5 References	31
EVALUATION OF <i>PHASEOLUS VULGARIS</i> EXTRACT IN A RAT MODEL OF CAFETERIA DIET-INDUCED OBESITY: METABOLIC AND BIOCHEMICAL EFFECTS	34

CONTENTS (Continued)

	Page
4.1 Abstract	34
4.2 Introduction	35
4.3 Materials and Methods	37
4.3.1 Materials and Sample Preparation	37
4.3.2. Animals and Experimental design.....	38
4.3.2.1 Animal experiment for obesity induction using SD and CAF	38
4.3.2.2 Animal experiment during treatment	39
4.3.3. Oral glucose tolerance test.....	39
4.3.4. Blood chemistry	40
4.3.5. Statistical analysis.....	40
4.4. Results	40
4.4.1. SDS PAGE.....	40
4.4.2. Body weight.....	41
4.4.3. Food intake.....	43
4.4.4. Energy intake	44
4.4.5. Oral glucose tolerance test (OGTT).....	45
4.4.6. Blood chemistry	47
4.4.7. Histology.....	49
4.4.8. Tissue index.....	53
4.5 Discussion.....	55
4.6 Conclusions	58
4.7 References	58
CONCLUSION	62
5.1 Conclusion	62
APPENDICES.....	63
APPENDIX A	64

CONTENTS (Continued)

	Page
APPENDIX B	68
APPENDIX C	70
BIOGRAPHY	73

LIST OF TABLES

Table	Page
2.1	Reviews of <i>P. vulgaris</i> on animals..... 14
2.2	Reviews of using of <i>P. vulgaris</i> human subjects 15
3.1	Encoded and coded levels of independent variables used in the experimental design. 26
3.2	Proximate analysis 27
3.3	Experimental design and responses of the dependent variables to the extract parameter 28
3.4	ANOVA of independent variables for percentage yield and alpha-amylase inhibitory activity respond..... 29
4.1	Initial body weight, final body weight, and body weight gained of male Wistar rats re-ceiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM. 42
4.2	Food consumption of male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM..... 44
4.3	Energy intake of male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM..... 45
4.4	Glucose tolerance test (OGTT) of male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM..... 47
4.5	Area under curve (AUC) of male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM. 47
4.6	Blood chemistry 49
4.7	Mean adipocyte area of adipose tissues for male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, and CAFM. 52
4.8	Tissue index of male Wistar rats receiving SDV, SDLP, SDHP, SDM, CAFV, CAFLP, CAFHP, CAFM..... 54
C.1	Products energy 71

LIST OF TABLES (Continued)

Table	Page
C.2 Chow diet energy.....	71
C.3 Syrup energy	72
C.4 Rats water intake.....	72

LIST OF FIGURES

Figure	Page
2.1 Pathophysiology of insulin resistance	8
2.2 White beans (<i>Phaseolus vulgaris</i>)	11
3.1 Response surface plots indicate the interaction effect of PBS concentration and extraction time, the interaction effect of PBS concentration and separation time, and the interaction effect of extraction time separation time on percentage yield (a) and alpha-amylase inhibitory activity (b).	30
4.1 SDS PAGE of PVE.....	41
4.2 Histology of livers of male rats received SDV (A), SDLP (B), SDHP (C), SDM (D).	50
4.3 Histology of livers of male rats receive CAFV (A), CAFLP (B), CAFHP (C), CAFM (D).	51
4.4 eWAT of SDV (A), SDLP (B), SDHP (C), SDM (D).	51
4.5 eWAT of CAFV (A), CAFLP (B), CAFHP (C), CAFM (D).	52
B.1 BSA standard curve	69
B.2 Maltose standard curve	69

LIST OF ABBREVIATIONS

°C	=	Degree
α AI	=	α -amylase inhibitor
Akt	=	Engage protein kinase B
ANOVA	=	Analysis of variance
ALT	=	Alanine transaminase
AST	=	Aspartate aminotransferase
BSA	=	Bovine serum albumin
BUN	=	Blood urea nitrogen
CaCl ₂	=	Calcium chloride
CAF	=	Cafeteria diet
Cr	=	Creatinine
DNS	=	Dinitrosalicylic acid
eWAT	=	Epididymal white adipose tissue
Fig	=	Figure
g	=	Gram
GDM	=	Gestational diabetes mellitus
GLUT4	=	Glucose transporter 4
HCl	=	Hydrochloric acid
HDL	=	High-density lipoprotein
IKK- β	=	I kappa B kinase
IRS	=	Insulin receptor substrate
JNK	=	c-Jun N-terminal kinase
KCl	=	Potassium chloride
kDa	=	Kilodalton
Kg	=	Kilogram
LDL	=	Low-density lipoprotein

LIST OF ABBREVIATIONS (Continued)

m	=	Milligram
M	=	Molar
min	=	Minute
mL	=	Milliliter
mM	=	Millimolar
mTOR	=	Mammalian target of rapamycin
Na ₂ HPO ₄	=	Disodium phosphate
NaCl	=	Sodium chloride
NAFLD	=	Non-alcoholic fatty liver disease
NaH ₂ PO ₄	=	Monosodium phosphate
NaOH	=	Sodium hydroxide
NCDs	=	Noncommunicable chronic disease
NFkb	=	Nuclear factor kappa b
nm	=	Nanometer
PBS	=	Phosphate-buffered saline
pH	=	Potential of Hydrogen ion
PI3K	=	Phosphatidylinositol 3-kinase
PVE	=	<i>Phaseolus vulgaris</i> extract
RSM	=	Response Surface Methodology
SD	=	Standard diet
SDS-PAGE	=	Sodium dodecyl sulfate-polyacrylamide gel electrophoresis
T1DM	=	Type 1 diabetes mellitus
T2DM	=	Type 2 diabetes mellitus
TC	=	Total cholesterol
TG	=	Triglyceride