

THE EFFECT OF THERMAL TREATMENT ON STINGLESS BEE HONEY
(*Tetrigona apicalis*) FROM UITM JENGKA

NOR AZLIZA BINTI MUHAMAD

Final Year Project Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JANUARY 2020

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURE	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	
1.1 Background and Problem Statement	1
1.2 Significance of the Study	4
1.3 Objective of the Study	4
CHAPTER 2 LITERATURE REVIEW	
2.1 Quality level of Stingless Bee Honey	5
2.2 Thermal Treatment	5
2.3 pH Value	6
2.4 Acidity Value	8
2.5 Moisture Content	10
CHAPTER 3 METHODOLOGY	
3.1 Samples	11
3.2 Materials	11
3.3 Chemicals	11
3.4 Instruments	11
3.5 Method	12
3.5.1 Sample collection	12
3.5.2 Thermal Treatment	12
3.5.3 pH Value	12
3.5.4 Acidity Value	13
3.5.5 FTIR	13
3.5.6 Moisture content	14
CHAPTER 4 RESULTS AND DISCUSSION	
4.1 The pH value of stingless bee honey (<i>Tetrigona apicalis</i>)	15
4.2 The moisture content of stingless bee honey (<i>Tetrigona apicalis</i>)	16
4.3 The total acidity of stingless bee honey (<i>Tetrigona apicalis</i>)	18
4.4 Determination of functional group in stingless bee honey using FTIR	20

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS	25
CITED REFERENCES	27
APPENDICES	31
CURRICULUM VITAE	41

LIST OF TABLES

Table	Caption	Page
4.1	The pH value of stingless bee honey (<i>Tetrigona apicalis</i>)	16
4.2	The moisture content of stingless bee honey (<i>Tetrigona apicalis</i>)	17
4.3	The total acidity of stingless bee honey (<i>Tetrigona apicalis</i>)	18
4.4	Location of maxima of absorption bands FTIR, together with the appropriate for selected stingless bee honey made in terms of spectral 3700-900 cm ⁻¹ .	22

ABSTRACT

EFFECT OF THERMAL TREATMENT ON STINGLESS BEE HONEY (*Tetrigona apicalis*) FROM UITM JENGLKA

This study was conducted to analyse the effect of thermal treatment on stingless bee honey (*Tetrigona apicalis*) from UiTM Jengka. Even though the stingless bee honey species are similar, factors such as geographical and botanical origin will influence to the production of honey with different pH quality properties, moisture content and total acidity. This research provides more information on the thermal treatment of stingless bee honey *Tetrigona apicalis* at temperature 0 °C, 40 °C, 45 °C and 55 °C in determining the effect on pH, moisture content, total acidity and functional group. Stingless bee honey of a species *Tetrigona apicalis* was used in the current study. From the analysis, the value for pH at temperature 0 °C, 40 °C, 45 °C and 55 °C were 3.30 ± 0.010 , 3.25 ± 0.007 , 3.22 ± 0.000 and 3.20 ± 0.007 respectively. The moisture content of each temperature were also found to be decreased. The total acidity observed from this research were found to be above 120.33 meq/kg. Fourier-Transform Infrared Spectroscopy (FTIR) was used to determine the stretching vibration frequency in detecting the functional group of the compound. The greatest stretching vibration of the O-H in H₂O bands with the maximum at 3274.13 cm^{-1} was at the temperature 0 °C followed by temperature 55 °C at 3272.89 cm^{-1} , temperature 40 °C at 3269.66 cm^{-1} and temperature 45 °C at 3267.02 cm^{-1} . Stretching vibrations for both C-O in C-OH and C-C groups in the carbohydrate structure was seem very fascinating that clearly shows various sugar composition of stingless bee honey at different temperature. It could be concluded that, there are no change for functional group in stingless bee honey (*Tetrigona apicalis*) when heated.