

UNIVERSITI TEKNOLOGI MARA

**DETERMINATION OF SUSPECTED
NON HALAL FOOD PRODUCTS BY
USING PORCINE MITOCHONDRIAL
12S rDNA AND PORCINE LEPTIN
GENE**

KHAIRUNNISA HASSAN

Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Applied Sciences

March 2016

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 12th October 2015 to conduct the final examination of Khairunnisa Binti Hassan on her Master of Science thesis entitled “Determination of Suspected Non Halal Food Products by Using Porcine Mitochondrial 12S rDNA and Porcine Leptin Gene” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

Tengku Elida Tengku Zainal Mulok, PhD
Associate Professor
Faculty of Applied Science
Universiti Teknologi MARA
(Chairman)

Zainal Samicho, PhD
Associate Professor
Faculty of Applied Science
Universiti Teknologi MARA
(Internal Examiner)

Mohd Nasir Mohd Desa, PhD
Associate Professor
Faculty of Medical and Health Science
Universiti Putra Malaysia
(External Examiner)


SITI HALIJJAH SHARIFF, PhD
Associate Professor
Dean
Institute of Graduates Studies
Universiti Teknologi MARA
Date: 25th March, 2016

AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledgment that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Khairunnisa Binti Hassan
Student I. D. No. : 2011653066
Programme : Master of Science (by Research) – AS780
Faculty : Applied Sciences
Thesis Title : Determination of Suspected Non Halal Food
Products by Using Porcine Mitochondrial 12S
rDNA and Porcine Leptin Gene

Signature of Student : 

Date : March 2016

ABSTRACT

In the current era of market globalization, people in the world could not evade from imported food products. The demand for imported food products such as chocolates, biscuits and sweets are projected to escalate steadily over the next decade as a result of increasing consumption. Unfortunately, most of the imported food products do not have Halal Logo or with doubted Halal Logo. The demand for Halal food and other Islamic consumer goods is increasing. This study will be beneficial to provide new information of Halal products and easier for Muslim to choose the permissible products according to *Syariah* Law. The main objective of this study was to determine of suspected Non Halal processed food products by using porcine mitochondrial 12S rDNA and porcine leptin gene. A total of 66 samples of suspected Non Halal food products were screened for porcine mitochondrial 12S rDNA gene and porcine leptin gene primer pairs from the genomic DNA. The PCR products were separated on 2% agarose gel and visualized under UV light. Thirty seven samples were positive with mitochondrial 12S rDNA gene whilst 59 samples were positive with leptin gene. From these, 33 were positive with both primers. These results indicate that the samples of processed food products contained porcine derivatives. From the detection of the DNA products by using the two set of primers, leptin gene was concluded to be more specific than the mitochondrial 12S rDNA gene. Some of the PCR products of processed food products of mitochondrial 12S rDNA gene and leptin gene were sent to Genomic Bioscience & Technology Company for DNA sequencing. Then, the sequences of the DNA were used for sequence alignment in order to get a probe specific to Halal food. Two probes were obtained, one with 24 mers and 13 mers, respectively. Mitochondrial 12S rDNA gene was chosen to make a probe because it has more quality DNA for a probe compared to leptin gene. In addition, findings from this research also provide new information in the detection of pork in foods products for Halal authentication.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF PLATES	xii
LIST OF SYMBOLS	xiv
LIST OF ABBREVIATIONS	xv
CHAPTER ONE: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Significance of Study	4
1.4 Objectives of Study	5
1.5 Scope and Limitation	5
CHAPTER TWO: LITERATURE REVIEW	
2.1 Awareness of Halal Food Products in Malaysia	6
2.1.1 Halal Concept	7
2.1.2 Non Halal Concept	8
2.1.3 Food Adulteration	9
2.1.4 Lard	11
2.1.5 Islamic Belief	12
2.2 <i>JAKIM</i> (Department of Islamic Development Malaysia)	13
2.2.1 Role of <i>JAKIM</i>	14
2.2.2 Role of Halal Certification	16