

CHAPTER I

INTRODUCTION

1.0 INTRODUCTION

The increasing number of Muslim population in the last fifty years showed that Islam is the fastest growing religion (Burke, 2015). Hence, the reliability of halal food has become a big concern among the Muslim consumers throughout the world because the adulteration of *haram* or *shubhan* ingredients has been used widespread. Moreover, it has become difficult to identify them with the naked eye (Fadzillah et al., 2011). Adulteration is defined as to render (something) of poorer in quality by adding another substance, whereas contamination is defined by unintentionally adding or carelessly allowing a substance which will make the food dirty or harmful. Previous research has shown that the cheapness of lard has caused it to be commonly mixed in the food industry to reduce the production cost (Sucipto et al., 2011). *Haram* food is explicitly prohibited for the Muslims like eating the meat of porks and its derivatives or using it as adulterant or additives in food.

Lately, many issues were raised by the public as well as the authority regarding the reliability of *halal* products. For instance, the Cadbury chocolate issue has offended the muslim consumers regarding the contamination of lard in one of its product. (Food Safety News, 27th May 2014). It has been reported that lard

adulteration was found in many food products such as in cake formulation (Syahariza et al., 2005a), chocolate (Che Man et al., 2005a) and meat (Al-Jowder et al., 1997).

Food products such as vegetable oil was also involved in the contamination of lard as it had been reported by Marikkar et al. (2005). In Asean countries, Refined Bleached Deodorized (RBD) palm oil is an economically important cooking product due to its excellent storage stability and storage quality. Therefore, it is widely used by the Asians to cook and especially during frying either by shallow fry or deep frying.

There are several approaches for the detection method in determining the adulteration in food as listed by Cordella et al. (2002). Firstly is to determine the ratio between some chemical compounds and assume they ratios constant in the food. Therefore, addition of any substance into foods will modify the value of the abnormality in its chemical composition. However, it is usually associated with a large set of analysis and the use of chemometrics. The adulterated samples can be easily be distinguishable from authentic samples after taking into account of many analytical factors. Another alternatives method is to search for a specific marker in the products, either the chemical constituents or morphological components which can prove either adulteration or the authenticity of the food. Besides that, researcher may use analytical techniques to show the effect of adulterant on the physicochemical properties of the sample.

One of the analytical tools that was widely used to detect and separate a compounds was gas chromatography (GC) and mass spectroscopy (MS). The mass spectroscopy (MS) takes injected material, ionizes it in a high vacuum, propels and focuses these ions and their fragmentation products through a magnetic mass

analyzer, and then collects and measures the amounts of each selected ion in a detector. (Mac Master, 2008). GC/MS system is able to separate a mixture into their individual components, identifying and then providing quantitative and qualitative information on the amounts and chemical structure of each compound.

Later, the data from GC-MS could be analysed using chemometrics technique. Chemometrics is defined as the combination of mathematical, statistical and other logical based methods to interpret and manage the chemically derived data efficiently (Haswell, 1992). According to Che Man et al. (2011a), Principal Components Analysis (PCA) is an unsupervised pattern recognition technique used in multivariate analysis by projecting the original data into new data to reduced dimensions in matrices which are called scores and loadings. PCA is a method to identify the similarities and differences between groups of variables in data set and show the relationship between the samples (Shin et al., 2010). The technique has been successfully used to define the relationship in fatty acid of food lipids (Kadegowda et al., 2008).

1.1. PROBLEM STATEMENT

The abundance of recycled cooking oil in the market nowadays is an important factor that needs to be considered when consumer decide to buy recycle oil. There might be contamination from the previous food that is *haram* or *shubhan* in that cooking oil. Gas chromatography headspace technique was proposed as a simple and quick technique to screen and detect the presence of volatile compounds for lard in recycle cooking oil. A preliminary study on the effect of heating of lard as adulterant in fresh RBD palm oil was conducted to recognize the pattern of physicochemical and volatile compounds of lard in cooking oil. This can be used to provide information for the development of method for detection of lard in recycled cooking oil.

1.2. OBJECTIVES

Therefore, the objectives of this study were:

- i. To explore the physicochemical effects of temperature changes on oil spiked with lard at different concentrations.
- ii. To identify the volatile compounds in refined bleached deodorized (RBD) palm oil containing 15 % and 30 % lard after heating at certain temperatures and times.
- iii. To identify the pattern and trends of the effects by GC MS Headspace and chemometrics.