OIL CHARACTERISTICS OF DEEP FRYING AND PAN FRYING OF PALM OIL AND SUNFLOWER OIL

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ABSTRACT

The objective of this study is to determine the physical and chemical properties of palm oil and sunflower oil in repeated deep frying and pan frying. Second, to compare between deep frying and pan frying which oil shows a better performance. 5 kg of palm oil and sunflower oil is used to fry 2.5 kg of fries in electric deep fryer for 10 minutes while 1 kg of palm oil and sunflower oil were used to fry 0.5 kg fries in pan fryer for 10 minutes. First and final frying oil is collected to perform an analysis of peroxide value(PV), Free fatty acid(FFA), colorimetric, absorbance and FTIR analysis. An analysis such as anisidine value, total oxidation, total polar compound, rancidity, density and viscosity are not perform in this experiment. The result of the analysis shows that the quality of palm oil is better compare to sunflower oil after forth frying cycle while the quality of oil which used in electric deep fryer shows a good performance compare to pan frying.

CHAPTER 1

INTRODUCTION

1.0 RESEARCH BACKGROUND

Frying is the process where food or sample was immerse in the hot oil or fat at temperature in between 150 °c to 190 °c, (Khaled, Aziz, and Rokhani 2015). Fried food have a unique aroma, taste and textural properties which does not have by other cooking technique. To produce the best product of deep frying, it must be carried out at high temperature. However, the oils will undergo physical and chemical deterioration which may affects the frying performance and the shelf life of the fried products. An overuse of the oil used in frying will change the colour and texture of the food products. It also may be harmful to the human health, (Ramadan et. Al,2006).

Under this research, we used two types of oil which is palm oil and sunflower oil. Palm oil are widely used in cooking industry. The crude palm oil orange in colour will be refined, bleached and deodorization before it is proceeded to the fractionation process and change colour to yellowish. From the fractionation process, the oil will separate into two phase which is liquid olein and solid stearin. Liquid olein will be used in cooking and frying industry while solid stearin will be modified to be used in food processing. Nowadays, palm oil is an important energy sources for human as it is consisted various nutritious vegetable oil, trans

fat free and rich content of vitamin and antioxidants. But, the quality of the oil may change when it is used for frying.

Other than palm oil, there are another oil that can be used in the cooking and frying process which is soft oil. Soft oils are an edible oil that are liquid in the room temperature. There are a few examples of soft oil which is corn flower oil, sunflower seed oil and canola oil. Soft oils have characteristics same as other vegetable oils which contains a variety of minor component that beneficial to oil stability. Sunflower seed oil is obtained from the extraction of sunflower seed. It is light, odourless and mild in flavour. Sunflower seed oil is commonly used for frying, fast food preparation and processed food. Usually, sunflower seed oil will be one of the ingredient if the food in packaging. (Yuri Elkaim, 2014)

1.1 PROBLEM STATEMENT

During the frying process, there are many possible chemical reaction may be occurred in the presence of air. For example, hydrolysis, polymerization and thermal oxidation, (Paul 2009). This reaction may cause production of harmful compounds such as polymer and ketones which can change the quality of the frying oil. The frying oil will be reused until the colour of the oil change to be dark. As more frequent the oil to be used, the darker the colour the worst the quality of the oil. It is not good for health because it may contain undesirable chemical compound.

By using a repeated frying oil, it may harm to the human health. However, different oil shows different performance and physical and chemical characteristics. By determining the physical and chemical properties of an oil, the quality of frying oil can be predicted. It is also can protect consumer's health, (Bansal et al. 2010).

1.2 OBJECTIVES

1. To determine the physical and chemical properties of palm oil and sunflower oil to judge the quality of both oil in repeated frying of fries.
2. To compare between deep frying and pan frying which method shows the better performance of oil