SPECTROPHOTOMETRIC DETERMINATION OF ALKALINE CONTAMINANT MATERIALS (ACM) IN FRYING OIL

By

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ABSTRACT

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A spectrophotometric based method was optimized to determine the changes in alkaline contaminant materials (ACM) in palm oil, corn oil and sunflower oil during 5 consecutive days of frying. The maximum wavelengths of sodium palmitate in palm oil was obtained at 592nm and for corn oil and sunflower oil the maximum wavelength of sodium oleate was obtained at 596nm. The correlation coefficient (R^2) of the curve for palm oil, corn oil and sunflower oil were 0.9548, 0.8952 and 0.9846, respectively. The results showed that there was a significant difference ($p<0.05$) in ACM content for palm oil, corn oil and sunflower oil during 5 consecutive days of frying. The amount of ACM in 5 consecutive days of frying for palm oil, corn oil and sunflower oil calculated by the regression equation increased from 0ppm to 168ppm, 0ppm to 5.2ppm and 0ppm to 4.8ppm, respectively. The visual colour in standard solution for palm oil, corn oil and sunflower oil ranged from yellow (0mg/100g) to dark green (50mg/100g). The values of Hunter 'L' for palm oil, corn oil and sunflower oil ranged from 56.46 to 82.09, 61.19 to 74.17 and 51.29 to 72.70, respectively. The values of Hunter 'a' for palm oil, corn oil and sunflower oil ranged from –7.24 to –2.03, -1.78 to –4.91 and –0.12 to –4.65, respectively. The values of Hunter 'b' for palm oil, corn oil and sunflower oil was ranged from 34.72 to 58.77, 50.48 to 57.14 and 35.65 to 59.83, respectively.

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CHAPTER 1

INTRODUCTION

Deep fat frying is widely practiced and is one of the most important methods of food preparation. Deep fat frying is used extensively both at home and a commercial scale to enhance the organoleptic quality of foods. Deep fat frying is one of the most commercially used practiced in the preparation and manufacture of food in the world such as restaurants serving convenience foods such as fried chicken; french fried, potato chips and others.

During frying, oil is exposed to high temperature, moisture, and oxygen for long periods of time. Complex chemical and physical changes occur under these conditions, causing oil deterioration that may reach a point where high quality foods can no longer be prepared. A number of reactions occur in frying oil when lipid foods are fried, causing hydrolysis, oxidation and polymerization of the oil (Gil, 1998).

In the process frying oil the food materials leaching into oil, breakdown of the oil itself, and oxygen of the oil-air interfaces all contribute to changing the oil from almost pure triacylglycerol to a mixture at hundreds of compounds. These compounds regarded as surfactants affect heat transfer at the oil-food interface and reduce the interfacial tension (IT) between the two immiscible materials.