

A spectroscopy study of heated palm cooking oil using an open path optical method for free fatty acids concentration measurement

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ABSTRACT

Palm oil is a vegetable oil that is extracted from the fruits and seeds of the oil palm tree. Palm oil contains Free Fatty Acids, which can have negative consequences if repeatedly heated. Frequently heated cooking oil can undergo some physical changes such as colour darkens, Free Fatty Acids concentration increases, and an unpleasant odour is produced. The purposes of this study is to analyse the absorbance spectrum of repeatedly heated cooking oil and to measure the concentration of Free Fatty Acids. Using a spectrometer apparatus, heated palm cooking oil spectrum can be obtained and Free Fatty Acids analysis can be carried out using a technique called an open path method. The result shows that heated cooking oils have different absorbance spectrum and this analysis led to the development of an optical method for measuring Free Fatty Acids concentration. It is reported that this optical sensor is successfully measure the Free Fatty Acids concentration at 364 nm. The Free Fatty Acids concentration measurement is also verified using a chemical test and the result is aligned. This is an important step in order to distinguish the class of used cooking oil for the safety of consumers.

KEYWORDS

Optical sensor; Spectroscopy; Palm cooking oil; Free fatty acid

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