

Development of a new rapid method for monitoring frying fats quality

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The quality of frying oil used in deep fat frying contributes to the quality of the fried food. It is known that frying oils used continuously or repeatedly at high temperatures in the presence of oxygen and water from the food being fried, are subject to thermal oxidation, polymerization, and hydrolysis, and the resultant decomposition products adversely affect flavor and color. Moreover, undesirable substances such as polar compounds are formed during the frying process and continuous ingestion of these compounds can induce several cancers namely in stomach and lungs. Portuguese legislation prohibits the consumption of foodstuffs fried in fats containing more than 25% of polar compounds. Legislation of this kind is available in several developed countries; therefore the quality control of oils is a Critical Control Point (CCP) within an HACCP system.

The traditional method for determining the polar compound concentration (NP EN ISO 8420:1996) is expensive and time consuming and cannot be used for monitoring a CCP. The development of a rapid and reliable method to monitor concentration of polar compounds in oils became thus a food safety issue.

In this work, a test kit has been developed based on the change of colour of a compound as a function of the percentage of polar compounds present in the sample. The results obtained were validated through a comparison with the standard method. The assays were made for several commercially available frying oils and fats and also with real samples collected from restaurants and baking industries. Also, the time-stability of the test results and of the test kit itself were studied.

The test Kit returns five different colors depending on the percentage of polar compounds present, as displayed in the following table:

Color	% Polar Compounds
1	< 5
2	6 to 12
3	13 to 16
4	17 to 23
5	> 24

The obtained color remains stable for more than two months and can therefore be used as a registry in case of Sanitary Food Inspections. The test itself has a validity of one year after production.