QCL FOOD SCIENCE

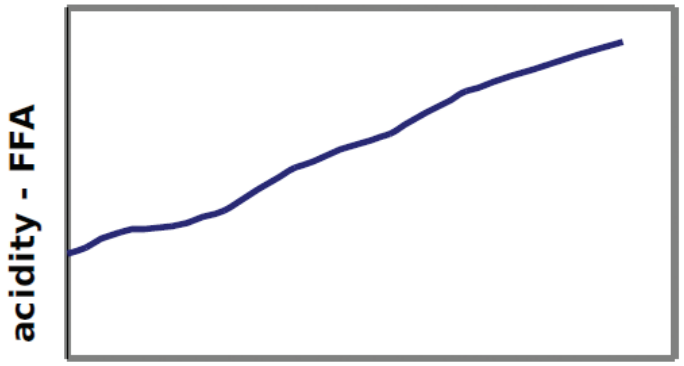
QCL

CDR FoodLab

Tests on Frying Oil

To obtain a high quality finished product, it is essential to continuously monitor the frying oil. The FoodLab analyser enables control of the quality of frying oil directly during the manufacturing stage with a fast, simple and reliable method.

Monitoring frying oil is essential to avoid unpleasant effects on finished products. Manufacturing plants usually have a filtering system that is designed to extend the life of the oil, while drastically reducing costs. However, it is still important to identify the parameters that indicate a progressive degradation of oil, as a result of the fact that physical and chemical properties of fried oil and fat tend to change significantly after extensive use.



Trend of the **ACIDITY** value over time found in an oil during the frying process

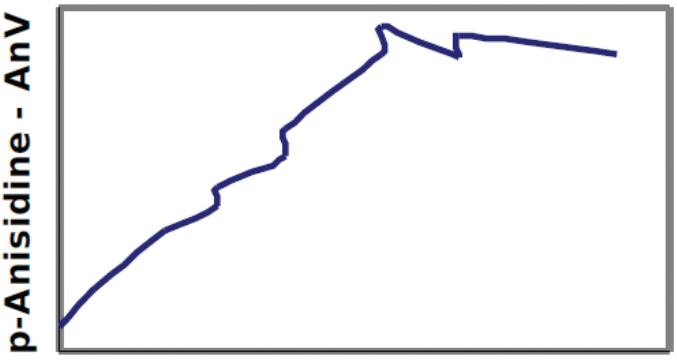
This phenomenon causes for example an increase of the total acidity. Recent studies have shown that the acidity of soybean oil heated for 80 hours (8 hours a day) at a temperature of 195° C yielded to an increase of oleic acid from 0.03 % to 0.59 % ("Food Chemistry"; H.D.Belitz, W. Grosch, P. Schieberle; Ed Springer 2004; pages 218-222). In addition to this, it is important to consider that the frying process also produces peroxides that immediately transform into polar compounds due to the high temperatures. Thus, Peroxide Value (PV) cannot be regarded an appropriate indicator.

The frying process also produces several volatile and non volatile compounds including aldehydes and ketones ("Food Chemistry"; H.D.Belitz, W. Grosch, P. Schieberle; Ed Springer 2004; pages 218-222). A study carried out on soybean oil used to fry chips showed that the p-Anisidine Value (AnV) was significantly influenced by the concentration of aldehydes and polymers, and by other sensorial evaluations ("The Evaluation of Frying Oils with the p-Anisidine Value";C.Tompkins and E. G. Perkins; JAOCS, Vol. 76, no. 8 (1999)).

Given these considerations, the most appropriate indicators to monitor the quality of oil during the frying process appear to be acidity and p-anisidine value, while the quality of incoming

Trend of the percentage of **PEROXIDES** over time found in an oil during the frying process

oil can be assessed using acidity and peroxide value as indicators. The limit values for each parameter that is indicative of physical and chemical alterations are influenced by several variables that include the type of oil, the type of food being fried and the frying method. It is therefore necessary to define experimentally the threshold values that represent the critical process control points. These values can provide an effective indication of whether the frying process complies with the requirements necessary to ensure a product with a high final quality.



Trend of the **p-ANISIDINE** value over time found in an oil during the frying process

The FoodLab enables manufacturers to perform the chemical tests required to determine the main parameters that influence the quality of vegetable frying oils with a fast, simple and reliable method.

Fast

The FoodLab can analyze frying oil samples to determine:

- Acidity (FFA) in 1 minute
- Peroxide Value (PV) in 3 minutes
- p-Anisidine Value (AnV) in 1 minute

It is also possible to perform tests on several samples (up to a maximum of 14) and thus carry out 80 acidity tests,

70 peroxides tests and 40 p-anisidine tests in one hour. Furthermore, the analyzer can be used to test soaps.

Simple

To run a test merely involves several simple steps:

- Add in exact amount of sample to the cuvette using a pipette
- Homogenize it
- Result is available in few minutes
- Results are printed by the built-in printer

This approach eliminates the involvement of costly equipment or intense training of operators to conduct complex chemical methods. Tests can be easily carried out even in an office.
At the end of test, there is no washing of containers, testing instrumentation or quartz cuvettes required.
Unlike NIR and other photometric systems, it does not require complex calibration operations because the analyser is supplied pre-calibrated. Calibration curves are pre-installed, but it is also possible to quickly and easily perform customized calibrations.

Reliable

The FoodLab owes its high sensitivity, accuracy and reliability to:

- Sophisticated photometric technology
- The digital processing of signals
- The ability to align the system with reference standards and samples with a known titration
- The availability of reading and incubation cells heated at 37°C

Guaranteed Quality: Correlation with ISO Reference Methods

Neotron Laboratories, certified by SINAL, performed a series of tests to compare the FoodLab analytical method and ISO methods in relation to the acidity and percentage of peroxides in fats and oils. The laboratory of SSOG (Laboratorio della Stazione Sperimentale Oli e Grassi) in Milan has performed a series of comparative tests on the analytical methods used for peroxides and assessed them as substantially compliant with the method described in Regulation EEC no. 2568/91.

The system was also included in the “Correlation ring test” for vegetable oils of Italian laboratories, organized by SSOG achieving excellent results. Comparative tests between ISO 6885: 2006 classic method and the FoodLabFat method have been carried out in a private lab to analyze p-Anisidine. The two methods have led to consistent results.

The FoodLab p-Anisidine Value (AnV) test was involved in the study “Oxidative stability of deep-frying oils ” presented at 6th Euro Lipid Congress - Oils, Fats and Lipids in the 3rd Millennium: Challenges, Achievements and Perspectives (07–10 September 2008 Athens, Greece). The study was carried out by Katharina D. Placke, Jan Fritsche (Hochschule für Angewandte Wissenschaften Department Ökotrophologie Hamburg) and Kim K. Kleeberg (Dr. Kim Kleeberg Umweltanalytik Hamburg) to compare the oxidative stability of conventional sunflower oil (SF) with high-oleic sunflower oil (HOSF).

FOR MORE INFORMATION CONTACT:
QCL, Riverside, Forest Row Business Park, Forest Row, East Sussex, RH18 5DW
qclscientific.com info@qclscientific.com 01342 820820