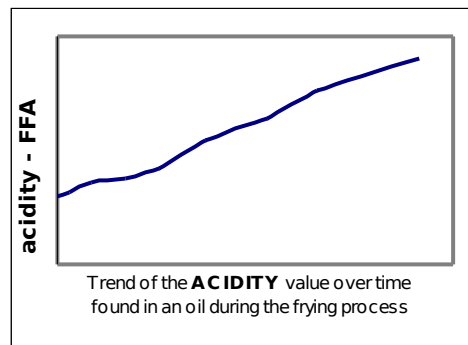


## Tests on frying oil

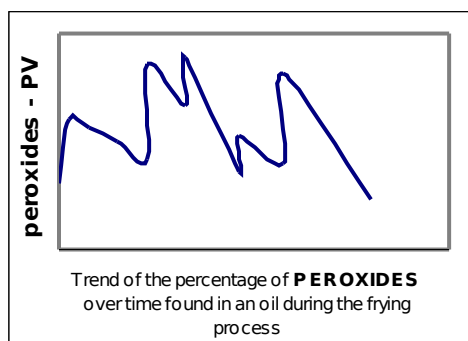
To obtain a high quality product, it is essential to continuously monitor frying oil. FOODLAB fat enables to control the quality of frying oil directly during the manufacturing stage with a fast, simple and reliable method.

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. This phenomenon causes for example an

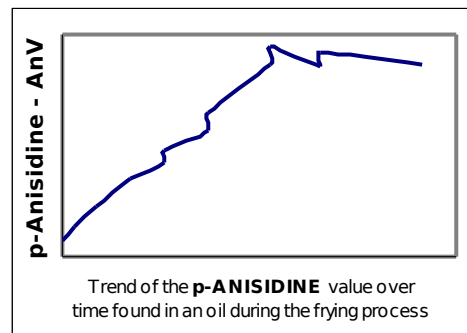
increase of the **total acidity**. Recent studies have shown for example that the acidity of soybean oil



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 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.

**FOODLAB fat**, which has been designed using the same state-of-the-art technologies and analytical principles of CDR **FOODLAB**, enables 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 innovative testing method of **FOODLAB fat** can be used to analyze frying oil micro-samples and to determine:

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

To further reduce testing times, it is also possible to perform test sessions 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, **it merely involves several simple steps.**

- Add in exact amount of sample to the cuvette by using a pipette
- homogenize it
- result is available in few minutes.
- results are printed by the built-in printer and thus users have a proper report

This approach eliminates the involvement of costly equipment or intense training for operators to conduct complex chemical methods. Tests can be easily carried out even in an office without messing up the place. 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 it is supplied pre-calibrated. Calibration curves are pre-installed, but it is also possible to quickly and easily perform customized calibrations.

## Reliable

**FOODLAB fat** owes its high sensitivity, accuracy and reliability to: a sophisticated photometric technology, the digital processing of signals, the possibility of aligning the system with reference standards and samples with known titration, and the availability of reading and incubation cells heated at 37°C.

## Guaranteed quality: Correlation with ISO reference methods

The laboratories of Neutron certified by SINAL, have performed a series of tests to compare CDR FoodLab's analytical method, employed in **FOODLAB fat**, 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 CDR **FOODLAB** method have been carried out in a private lab to analyze p-Anisidine. The two methods have let to consistent results.

Furthermore, **FOODLAB fat** for determination of p-Anisidine Value (AnV) was involved in the study “*Oxidative stability of deep-frying oils*” presented at **6<sup>th</sup> Euro Lipid Congress** - Oils, Fats and Lipids in the 3<sup>rd</sup> 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).

## System Overview

**FOODLAB fat** is constituted by:

- A thermostated **analyzer** based on photometric technology that uses solid-state emitters.
- A **kit of reagents** prepared by CDR research laboratories. Reagents are supplied in bottles with a shelf life of one year.
- **Pipettes** with fixed calibration to ensure a correct collection of samples and an accurate dosing of reagents.
- Interface for PC connection.
- **User manual**.
- Illustrated **data sheets**.
- **DVD with filmed methods**.

**FOODLAB fat** is in compliance with analytical specifications as per EEC REGULATION no. 2568/91 and subsequent amendments, and is supplied with a 3-year warranty.