



## Test Kit Technologies, Inc.

### Establishing Discard Points for Industrial Frying Oils

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**Problem:** There is a time in the life of all frying oils when they must be discarded because the quality of the food being produced no longer meets established quality standards. How does an industrial processor determine this point? And once determined how can it be monitored?

**Background:** What goes on in a deep fat fryer is incredibly complex, but when viewed from an engineer's perspective can be seen as rather simple. The fryer, the volume of oil, the temperature of the frying oil, and the condition of the food entering the fryer are all generally controlled and may, therefore, be considered constants in most fryer operations. Yet the quality of the food as it exits the fryer changes over time. The changing variable is the frying oil itself. What begins as a nearly homogeneous mixture of triglycerides (fresh frying oils are 96-98 % pure triglyceride) is altered through exposure to the food, high temperatures, and metals in the fryer, the air, and reactions between food and degradation products in the oil to become a mixture of literally hundreds of compounds. Individually, most of these compounds have little effect on the food being produced, but taken as groups, they can be shown to do so. The question is what groups of compounds should be monitored in evaluating a frying system.

A large number of oil chemists around the world have determined that the best measurable index of oil quality, especially in regard to oil discard point, is the total polar materials (TPM). Polar materials may be simply defined as all non-triglyceride materials in an oil. For example, the fresh oil described earlier contained 96-98% triglycerides. The remaining 2-4 % are considered the polar fraction. As an oil breaks down, the triglycerides break down and the total polar materials decrease. In measuring TPM, you are measuring accumulated degradation products. Regulators have also found that TPM is the best index of oil quality for their purpose, and many have established regulatory limits for restaurant frying oils.

**Using the VERI-FRY<sup>®</sup> TPM Test to Establish Discard Points for Industrial Frying Operations:** Food processors have established specifications for their products. The VERI-FRY<sup>®</sup> TPM test can be used to set limits in your fryer to assure that these product specifications are maintained. To set oil standards, begin monitoring oil quality using the TPM test when frying is initiated with fresh oil in a clean fryer. It is also recommended that other tests be conducted to gain a better understanding of the degradation occurring in your particular frying process. Side by side with the TPM test (and others), evaluate the sensory qualities of the product as it exits the fryer. When finished food begins to show undesirable qualities, evaluate oil quality using the TPM more frequently. When food quality is deemed undesirable, collect additional oil samples and do several TPM tests. These become your standards for endpoint determination for consistently good quality food products.

**Benefits of Using the VERI-FRY<sup>®</sup> TPM Test for Endpoint Determination in Industrial Frying:** The VERI-FRY<sup>®</sup> TPM test can benefit an industrial fryer in several ways. Monitoring and controlling oil quality will enhance food quality, reducing the amount of product placed on hold or discarded, and providing more consistent materials to your customers. Also, the TPM encourages Total Quality Control by allowing production staff to make quality decisions on-line, giving them a greater feeling of ownership of the finished product and process, while still maintaining company standards.