



Test Kit Technologies, Inc.

The Use of the VERI-FRY® Water Emulsion Titrables (WET) Test to Monitor The Effectiveness of Caustic Removal During Oil Refining

Problem: In conventional refining of edible oil, caustic treatment is the most common and practical means available to remove free fatty acids and other impurities from the oil. Following alkali treatment, the caustic and its reaction products must be removed from the oil, but there is no easy method to monitor how effectively this treatment really is.

Background: Neutralization or caustic refining has been in use for over 100 years. It is used to cleanup edible fats and oils. Fats and oils, following rendering or extraction or from animal or vegetable sources, contain many undesirable impurities. These impurities include fatty acids, gums, metals, moisture, hydrocarbons, phospholipids, proteins, color bodies, carbohydrates, and oxidative by-products. If they materials are allowed to remain in the oil, they can adversely affect shelf life and performance of the product. The most common method of removing these materials is alkali refining. In this process, alkali (usually NaOH) and water are mixed with the crude oil. Under controlled conditions of mixing and temperature, the undesirable components react with the alkali to form an emulsion, which is then removed from the oil. Some of the triglycerides also react with the alkali forming soaps. The key to this operation is to remove the undesirable components with minimal loss of the desirable oil. The residual soaps and water are then removed in separators, through acid treatment, and bleaching. The target is a finished oil with very low or non-existent levels of soap. It is essential that the residual levels of soap be reduced to almost zero, particularly if the oil is to be used to blend frying oils. Excessive levels of soap in frying oils will speed oil degradation and can cause "fresh" oils to foam.

How to Use the VERI-FRY® WET Test to Monitor Efficiency of Alkali Removal: To monitor the efficiency of alkali removal, refiners measure the ppm soap in the refined oil. This titration takes approximately 20-30 minutes and must be done in a laboratory by a trained technician. The VERI-FRY® WET test can be completed in less than 2 minutes and can be done right at the processing location. This allows operators to instantly evaluate the efficacy of the process and divert product for additional refining if needed.

Benefits of Using the VERI-FRY® WET Test: The first and most obvious benefit is more prompt evaluation of the process. Having the ability to make decisions at the line can reduce operating costs and improve efficiency. The WET test is also less expensive than the recommended titration procedure and uses no chemicals or reagents, which must be disposed of as chemical waste. Finally, the tests can be retained with lot samples of refined oil to demonstrate oil quality.