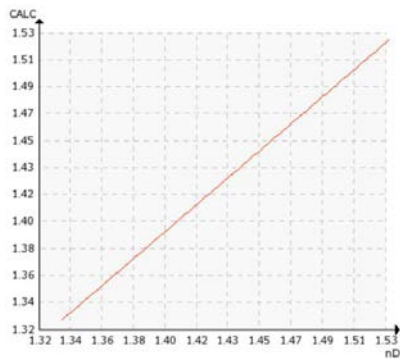


FATS AND OILS

Typical end products

Margarine and spreads.

Chemical curve: R.I. at Ref. Temp. of 20°C



Introduction

Margarine is a stabilized water-in-oil emulsion which was developed as a substitute for butter. Margarine is made from one or more vegetable oils or animal fats, mixed with an aqueous portion containing milk products, salts, and other ingredients such as flavoring agents, emulsifiers, vitamins, preservatives and butter.

Margarine is used principally as a spread but is used also for flavoring and cooking.

Application

The main components in the production of margarine are a fat phase, a water phase and minor ingredients including salt and emulsifiers.

The fat phase contains the fat-soluble ingredients. These are usually fat-soluble flavors, vitamins as well as emulsifiers and carotenes. The aqueous phase holds the water-soluble ingredients, which are generally water-soluble flavors, salt, milk or milk solids, and in special cases, preservatives.



The first stage in margarine production is usually done in batches and involves the preparation of the water and fat phase. The water phase is prepared by mixing in water milk proteins, salt, preservatives and other water-soluble ingredients. The fat phase is a blend of different fats and oils. The ratio between the fats and oils is decisive for the performance of the final product and it can be controlled, for instance, by refractive index measurements.

Next, the phases are mixed together thoroughly and pumped into a buffer tank. From there on the process is continuous. The final margarine product is cooled and then moves on to packaging.

Instrumentation and installation

The K-Patents Sanitary Refractometer PR-43-AP-T is installed directly in the fat phase tank through an APV Tank Bottom Flange. The refractometer measures

accurately and continuously the refractive index of the

Instrumentation	Description
	<p>K-Patents Sanitary Probe Refractometer PR-43-AP for hygienic installations in large pipes, tanks, cookers, crystallizers and kettles and for higher temperatures up to 150°C (300 °F). The PR-43-AP refractometer is installed in the pipe line or vessel through a 2.5 inch or 4-inch Sanitary clamp, I-clamp, APV Tank bottom flange or Varinline® connection.</p>
	<p>K-Patents Sanitary Flush Mounted Refractometer PR-43-AP-T for hygienic flush mounting installations in cookers, cooling crystallizers and other vessels that have scrapers or mixers. Installation through an APV Tank bottom flange.</p>
<p>User Interface</p>	<p>Selectable multichannel MI, compact CI or a web-based WI user interface options allow the user to select the most preferred way to access and use the refractometer measurement and diagnostics data.</p>
<p>Measurement range</p>	<p>Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 Brix.</p>

blend during the preparation of the fat phase to determine the correct fat and oil proportion. This is an important measurement before continuing to emulsification.

The in-line measurement by the refractometer provides real-time QA monitoring of the blend and eliminates the need for sampling and laboratory tests, thus increasing productivity and reducing batch time.

In addition, the real-time measurement by the K-Patents refractometer provides instant information for ingredients dosing, and helps to produce margarine with the desired characteristics, functionalities and consistent quality.