Modern Deodorizing Methods

Quality of Edible Oils Dependent
Upon Design of Distilling Equipment

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ANY of us have seen and can recall the original deodorizing tanks that were at the plant of the N. K. Fairbank Company at Chicago. (This plant is now dismantled.) If they were not actually the first treating tanks for vegetable oils in the United States, they were certainly among the first of their kind, and were typical of that early period. They were merely steel holding tanks in which neutralized oil was stored, and heated with pressure steam which passed through a closed coil.

Early History of Deodorizing

During the heating process, the oil was blown with steam, which carried away certain of the more volatile compounds, producing a decidedly beneficial effect upon the flavor and odor, as compared with the untreated oil. This process was far from perfection, but nevertheless was a step in the right direction. The entire layout and process would now be considered crude, to say the least, yet a number of years passed before any radical improvements were made.

It may interest and surprise some readers to learn that there are still a number of refineries throughout the country producing edible vegetable oils and lard compounds with equipment and methods as antiquated as in this first installation; yet in spite of this, and the great advancement made in this highly specialized field, they claim to produce choice products of the highest quality.

Introduction of Superheated Steam

One of the first great improvements was made when superheated steam was introduced for the blowing process.

Before this time, steam at 125 lbs. boiler pressure was ordinarily used. This pressure gave a final temperature in the oil of about 345°F., after many hours of heating.

When superheated steam was introduced for blowing, it not only proved to be a better medium for carrying away the distilled vapors, but it also produced a rise in the final temperature of the oil to approximately 390°F. This higher
temperature shortened the deodorizing process to about five hours, and also caused the distillation of a higher percentage of the volatile compounds, which in turn made a further improvement in the flavor and odor of the finished oil. Up to this time, however, all of this work was carried on under atmospheric pressure, and the greatest gain in quality was still to come by the use of vacuum distillation.

Vacuum Deodorizing

As the demand for edible vegetable oil products increased, alert refiners began searching for new ways to further improve the quality, and it is natural that the distillation of the volatile bodies under vacuum should be the next step in a process of this kind.

Vacuum distillation, particularly in connection with vegetable oils, serves two major purposes—

First—it minimizes the damage caused by oxidation, which was all too prevalent when the oil was distilled under atmospheric pressure and exposed at its highest temperature to the open air.

It is a well known principle that a vegetable oil possesses a great affinity for oxygen, especially at temperatures above 140°F., and when exposed at this temperature to the air, it will absorb the oxygen therefrom. As the temperature of the oil increases above 140°F., its rate of oxygen absorption actually accelerates in proportion to the temperature increase.

Second—the use of a vacuum materially lowers the boiling or distilling point of the volatile compounds, just as the boiling point of water is lowered from 212°F., at atmospheric pressure to 32°F., when a perfect vacuum is attained. Consequently, an equivalent degree of heat applied to oil, under a high vacuum, produces an exceptionally better result than when applied at atmospheric pressure.

The attitude of certain manufacturers, when they persist in their policy of “We are getting by, why change?” is a strange commentary upon the tastes of the American public, and it is, indeed, puzzling to know that huge quantities of oil are still being deodorized, or supposed to be, without the use of the vacuum still.

Oxidation of vegetable oil is directly attributable to exposure to any source of oxygen absorption, and as this makes the oil incipiently rancid, its life, or keeping quality, is very short. Under such conditions, therefore, as open distillation with temperatures of only 345°F. in the oil, the undesirable flavors and odors cannot be entirely driven off, and yet this is the whole purpose of the deodorizing process.

It is true, of course, that a certain trade will buy an inferior product, if they can get it at a favorable price, and will even become accustomed to an off flavor, rating it as “quality.”

Cases are known of refiners who boasted of “bland neutral flavor,” which actually was merely a flat oxidized flavor, and still others mistook a soapy flavor for “sweet nutty flavor.”

Modern practice, insofar as the deodorizer is concerned, is to use vessels of rugged construction sufficiently strong to withstand the highest vacuum that can be produced, and equipped with high vacuum pumps and condensers for distilling the vapors driven off. The high quality of oils which are produced in equipment of this kind, has placed this process on a highly scientific basis, and caused the refiners to seek still further means of improvement.