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RATIONAL WAYS OF SUNFLOWER OIL REFINEMENT AND EMPLOYING ITS USEABLE BYPRODUCTS

When extracted according to the now available technology, sunflower oil has many by-products of diverse composition and characteristics, and some admixtures that do not naturally accompany triglycerides.

The pattern of oil refinement and comprehensive use of separated substances is by now well worked out.

The full refinement cycle consists of hydration, neutralisation, freezing and deodorizing, and is used at some oil factories in production of food oil delivered through retail trade and public catering enterprises.

The oil intended for hydrogen treatment is not frozen or deodorized now.

The oil used in technology must be treated to remove phosphorus-containing substances and dyes and preserve fatty acids if possible.

The bulk of the substances accompanying sunflower oil are phosphorus-containing substances whose composition is complex and characteristics diverse.

Phosphatide extraction from sunflower oil (so-called hydration) is currently a self-contained and important process that improves the oil quality and extracts condensed phosphatide as a byproduct.

At the first stage of hydration the oil is warmed up to 50°-55°C and vigorously mixed with an amount of water that makes one to 1.5% of the oil's weight. Then the mixture is exposed and oil divided from the sediment using separators. Phosphatides are dried in vacuum film devices at the temperature of 80°-85°C.

Using separators for division of hydrated

phosphatides from oil, and thin film for their drying in vacuum has sweepingly improved the condensed phosphatide quality. Hydration has become a continuous process, and concentration of pure phosphatides in the byproduct extracted has reached 60-65% while water contained in it makes only 0.2-0.7%. This proved to be of much help in confectionery, as diluting coefficient of the condensed substance has grown from 1.5-2 to 4.5. Phosphatides extracted by the new technology remain liquid even under 20^o-25^oC, which makes their dosing much easier.

Condensed phosphatides have been tested at a number of Moscow and Leningrad confection factories for producing raw chocolate, and have proved to economise as much as 80 kg of cocoa oil per ton of raw chocolate.

Condensed phosphatide also made a good and much-demanded fodder containing no less than 40% of phosphatide and up to 60% of oil whose acid number does not exceed 25 mg KOH.

To obtain high-quality phosphatides, fresh oil got by pressure or extraction must be hydrated immediately, without storing it in oil tanks.

To neutralize unbound fatty acids sunflower oil is, most rationally, treated in alkali, which provides the highest amount of refined oil produced, while the small concentration of caustic soda solutions applied causes but an insignificant alkalisation of neutral fats. Soapstock equals but 1.25 \bar{x} when this technology is used (\bar{x} is the acidity of oil in %).

Combined technology is used at a number of oil-and-fat factories: first, oil is neutralized in a column-type apparatus by soap, then washed in water which is later extracted by separator, and then treated in a solution of citric acid to fully remove soap, and dried in vacuum. This method yields better

results, technologically and economically, than periodic or separation refinement.

At the present stage, cere cannot yet be fully removed from sunflower seed. The shell and cere are removed by hulling only partially, and a considerable portion of waxy substances is preserved in oil.

Wax drops out of oil at low temperatures, which quality is used in industry. Refined oil is cooled alternately with fresh and salted water, until it gets the temperature of 10° - 12°C , then, after four hours, at least, in this temperature, it is filtered. The All-Union Research Institute of Fats has recommended substances that aid filtration - filter-perlyte and kiselgur K-700. Transparent oil, that does not turn turbid even at 5°C , completely void of wax and phosphorus-containing substances, is obtained as the result of that process, called freezing. Besides, the oil acid number diminishes, and the quantity of non-alkalized substances, too.

Deodorizing helps extract substances that lend oil a taste and a smell, and implies treatment of oil with steam at 210° - 230°C and the pressure of 1-2 mm, which makes the last operation in oil refinement.

The Research Institute of Fats has also worked out a technology of non-alkali neutralisation of hydrated sunflower oil by treating it with a solution of citric or phosphoric acid, with subsequent removal of metal catalyzers by adsorption and neutralisation of unbound fatty acids by distilling the oil which is also deodorized at the temperature of 220° - 230°C and residual pressure of not more than 2 mm. This technology excludes formation of soap-stock, so lessening neutral fat losses, and has been successfully employed by a number of factories thanks to its expediency.