

Tirtiaux Fractionation: Industrial Applications

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Natural fractionation provides a simple and economical solution to the problem of separating most edible fats and oils into several products. The Tirtiaux process, with its accurate crystallization control, and long industrial experience, allows a choice of crystallization conditions and separation temperatures to ensure obtaining products of specific quality at low cost. This is the result of a technique which consists mainly in the formation of suitable crystal seeds and the control of their growth by regulating the heat transferred from the fat to the coolant.

The choice of separation temperature and the ability to refractionate any one of the end products gives a wide range of possible qualities. The separation is done on the Tirtiaux Florentine continuous vacuum filter equipped with a stainless steel perforated belt as filtration support. A recycling device for any crystals sucked through the belt at the edge of the horizontal vacuum surface ensures a filtration on a preformed cake. The coarse mesh of the belt together with the large size of the crystals obtained allow an easy filtration with low vacuum, even if the viscosity of the oil is high. The filter is, therefore, able to operate on delicate crystals as those obtained when fractionating hydrogenated soybean and fish oils or when refractionating palm olein at low temperatures.

The process is now widely used for separating palm oil in two or three fractions, for beef tallow single or double fractionation, for dehydrated butter, hardened soybean oil and fish oil, interesterified lard, totaling effectively over one million tons per year. A large part of this production is done on palm oil in tropical areas and destined for export or for local markets where the olein has to remain limpid in cooler areas and where stearins have to be suitable for margarine and shortening manufacture. New developments on beef tallow multiple fractionation are worth mentioning.

A wide variety of products can be obtained, ranging from a superhard stearin of melting point 56 C (133 F) down to beef oil with melting points lower than 20 C (68 F). Intermediate products can be accurately tailored for margarine and shortenings. Complete analysis by nuclear magnetic resonance (NMR) and high performance liquid chromatography (HPLC) are available on tallows of various origins. As an example, Figure 1 shows an NMR analysis of industrial fractionation of a titer 42.5 C (108.5 F) beef of European origin.

The operation on interesterified lard is similar and analyses are also available. Fractionation of selectively hardened soybean oil is performed in the same plant equipped with a suitable refrigeration system to enable fractionation at 2 C or below.

In other words, this fractionation plant is basically adapted to any fat or oil which can be fractionated and is flexible, accurate and low cost.

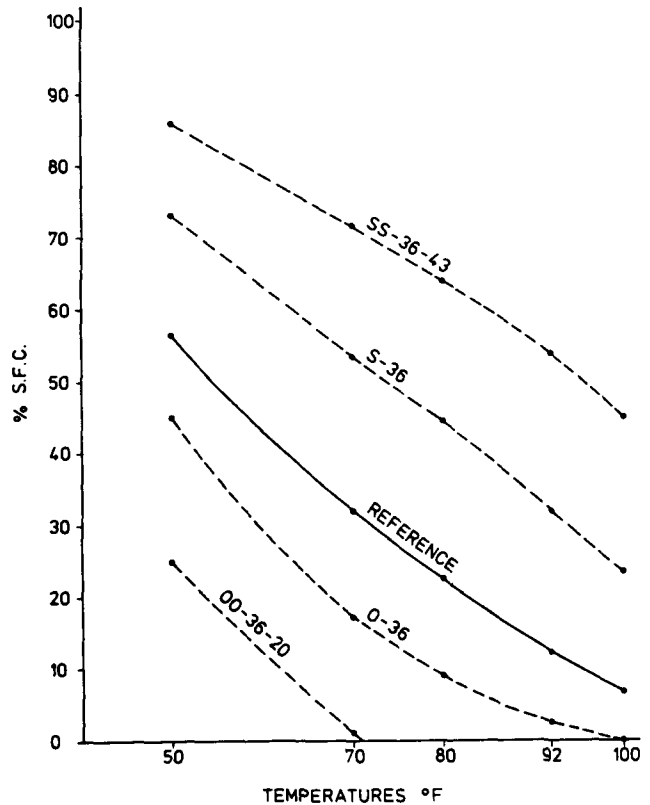
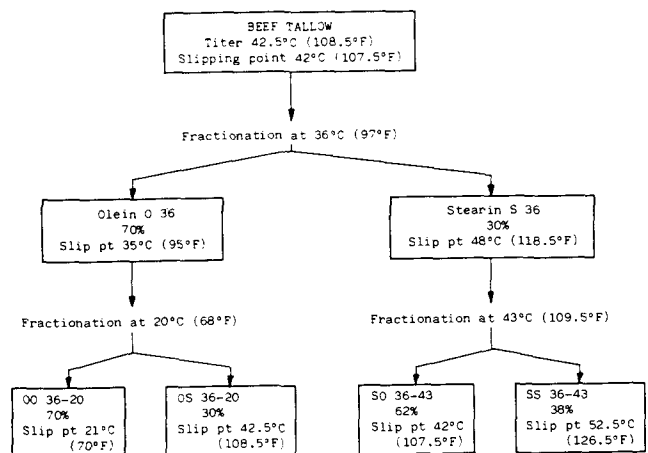


FIG. 1. Solid fat content of beef tallow. Swine beef: slip point = 41.8 C, titer = 42.5 C.



SCHEME