

Application of Short-Path Distillation for Processing Edible Oils and Fats

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Short-Path distillation permits the successful separation of heat sensitive and high boiling point materials at significantly lower temperatures due to operating pressures as low as 1 – 0.001 mbar during distillation. As a consequence, the boiling points of such compounds or mixtures are reduced by 300 K or more compared to the atmospheric conditions.

To achieve such low operating pressures a special orientation of evaporator surface versus condenser surface is required as the vapors have to have a maximum cross section on their way from the point of evaporation to the point of condensation in order to minimize the pressure drop across the distillation device. Furthermore, the residence time on the hot evaporator surface has to be minimized. Short-Path distillation addresses the issue of pressure drop by situating the condenser centrally inside a Wiped Film Evaporator.

Short-Path distillation is used for processing edible oils whenever heat sensitive components contained therein have to be distilled or when the oil itself contains triglycerides which are heat sensitive due to the large number of highly unsaturated fatty acids. Typically Short-Path distillation may be used to remove undesired components at temperatures of approx. 200 °C such as free fatty acids (physical deacidification), pesticides or cholesterol. Furthermore Short-Path distillation is used to concentrate or purify minor, but valuable, compounds of side streams from the oil refining process such as tocopherols, tocotrienols, and phytosterols from deodorizer distillate. Finally some compounds may be distilled directly out of the crude or pre-refined oil such as squalene from shark liver oil.