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Perspective

# Processed Food by Vacuum Distillation

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## DESCRIPTION

There are different types of distillation are being used in the food processing industry to separate and purify volatile food products from liquid mixtures, some taints and flavors, from edible fats and oils. A common type of distillation used for such applications is vacuum distillation.

To know about the vacuum distillation in food processing, it is mandatory to first understand what vacuum distillation and how it works. Vacuum distillation is a technique of separating a liquid compound based on difference between their boiling points. It usually takes place under low pressure which decreases its boiling point and allows the process to take place at a lower temperature.

In this process, the pressure in the column above the solvent is decreased so that it is less than the vapor pressure of the compound. As a result, a vacuum is created which causes the elements of the compound that have a less vapor pressure to evaporate, leaving behind a purified distillate. This method is used for purifying compounds quickly and efficiently and is beneficial for compounds that are not ready to be distilled at atmospheric pressures.

Vacuum distillation is extensively used in processing of food in industry for various different applications. Usually, fractional distillation is used as to separation of a mixture into its component parts. However, obtaining the extremely pure components is very necessary in the food processing industry through the implementation of only fractional distillation is generally highly challenging or virtually impossible. As such, successive distillations such as vacuum distillation are often used to obtain a higher grade of purity. The various common uses of vacuum distillation in the food processing industry are as follows:

- The creation of flavors
- The manufacture of alcohol beverages from fruits and some grains
- Concentrating essential oils
- Deodorizing fats and oils

Deepfreeze has been a hot subject in the drinks world for some time now, substantially in its manifestation as ice. Lately it's come crystal clear how cold can put fresher flavors in the bottle, before ice cubes indeed get into the act. By distilling it without applying heat, gin makers are creating livelier spirits, and bartenders and chefs are pulling out the flavor essences with good purity. Distillation will concentrates the alcohol and aromas in a liquid by evaporating and then after collecting these volatile components, while leaving behind nonvolatile qualities, like bitterness, sourness and astringency.

Traditional distillation evaporates the volatiles at temperatures between 76 and 93 degrees Celsius, so the liquids and all flavoring ingredients in them are cooked in the process. Cooking changes the quality of many aromas, especially more delicate citrus, delightful and fruity ones.

Hence the function of vacuum distillation, in which air and vapors are pulled out of the distillation container, reducing air pressure and causing the volatiles to evaporate at a lower temperature The advanced the vacuum, the colder the temperature at which alcohol and aromatics can be distilled, and the less cooked the performing flavors are. Vacuum distillation, also called cold distillation, has been used for years in the manufacture of better gins and shochus, but with relatively modest temperature reductions, to around 54 degrees.

The separation of essential oils and its productivity depends on the mass and energy transfer between the mixtures of liquid phase and also vapor phases. Factors that directly affect the outcomes are packing type, diameter, and height of the packed column. Essential oils are a blend of aromatic compounds and other volatile compounds. Terpenes are usually unstable at high temperature, oxidizing at high temperatures. Consequently, the distillation procedure is generally performed at vacuum pressures to reduce the volatile mixture's temperature of vaporization. The main function of vacuum fractional distillation is to separate essential oil constituents is rarely reported, however it is often used in the petrochemical industry.

This invention relates, generally, to an improved method of controlling the content of oil and fat deodorizer distillates in

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condensate water and to the recovery of such distillates therefrom. The invention relates more particularly to the recovery of oil distillates (e.g., `soybean oil distillates) which form emulsions within the condensate water utilized in removing and recovering such distillates from deodorizer vapors. The use of water-soluble proteins, notably corn steep water, to interrupt such emulsions and affect the recovery of the distillates therefrom constitutes a crucial feature of the invention.