

דרך קצרה

Brief summaries of cRc Kashrus Policies

DISTILLATION COLUMNS [PART 1 – OPERATIONS]

Distillation is a process used to separate two liquids which are mixed together, by heating the mixture to a temperature where one of the liquids evaporates/boils and the other does not. The liquid with the higher evaporation point drops to the bottom of the column (and drains out of the column), while the one with the lower evaporation point rises out of the "column". Once the vapor leaves the top of the column, it passes through a "condenser", which is a chamber surrounded by pipes filled with cold water (or other liquid). This causes the vapor's temperature to drop enough for it to condense back into a liquid.

A well-known example where distillation is used is to create whisky. When grape juice ferments it creates a liquid that is 12-14% alcohol, and a similar alcohol level can be obtained by fermenting liquids created from sugars or starches (e.g., honey, barley, corn). Alcohol boils at 173° F while water boils at 212° F and therefore if wine is distilled at 180° F, for example, the alcohol will boil out but the water will not. The alcohol

vapors that escape will be condensed back into a liquid state, which might be 40% alcohol, and which we would refer to as "brandy". [If the starting material had been honey, barley, or corn, the resulting whisky would potentially be mead, Scotch, or bourbon].

Distillation of wine to create whisky is a simple process since the difference in boiling points between the two liquids (alcohol, water) is very large. In other cases, the boiling / evaporation points are closer together and a more advanced "still" is required. This might be necessary when deodorizing oils, in an essence recovery column, or in fractional distillation of fatty acids; therefore, those stills (i.e., distillation columns) tend to be considerably larger than the ones used for whisky.

Definitions

Deodorize oil – Remove those components in an oil (or fat) that cause an unpleasant oil, rendering the oil more suitable for users.

Essence recovery – Fruit juices are concentrated by boiling most of the water out of them. The "flavor essence" boils out with the water and must be recovered/isolated from the water, so it can be added back into the juice.

Fractional distillation – When fat or oil is "split" into glycerin and fatty acids, all the fatty acids are mixed. For example, the fatty acids from coconut oil might include lauric, caprylic, capric, myristic, palmitic, oleic, stearic, and linoleic acids. Distillation isolates individual fatty acids from the mix, so that they can be used appropriately.

For many distillation columns, merely heating the product to a specific temperature will not efficiently separate the two liquids from one another, and they take advantage of



the principle that evaporation occurs at the liquid's surface.

In a still, the liquid's surface area can be increased in a few ways: One is that the column can be filled with "random packing", which are pieces of metal, plastic, or ceramic that have different shapes and are each 2-3 inches in size.

Ceramic packing is *cheress* and cannot be *kasher*.

As the liquid pours through the "bed" of packing it gets broken into hundreds of different channels as the water bangs into the different pieces of packing. This greatly increases the surface area. [A variation of this is "structured packing" which is a large, corrugated metal piece which looks somewhat like a car radiator]. As the liquid

trickles down through the packing, steam rises from below to heat the droplets. The portion which evaporates becomes absorbed in the steam vapor and rises out of the top of the column.

Another method of increasing surface area is by building a series of "trays" inside the column. The trays are designed so that liquid can spill over from one to the next, and all of that flowing and pouring exposes different surfaces. At the same time, steam permeates the liquid (on the trays) which also increases evaporation.

In either of these systems, the steam rises out of the top of the column together with the evaporated portion of the original liquid, and they are then condensed into liquid form.

מראה מקומות

שולחן ערוך סימן תנ"ב סעיפים ג'-ד'