GLOSSARY OF INDUSTRY TERMS

SECTION II: BASIC PRINCIPLES OF STEAM DISTILLATION

Steam Distillation

Most essential oils are obtained from the plant material by a process known as steam distillation. Descriptions and explanations of the theory and practice of steam distillation are given elsewhere (AMES and MATTHEWS, 1968, and DENNY, 1991) and the reader is referred to these for detailed discussions of equipment needs, distillery layout and methods. An indication of what is involved is given here.

The fundamental nature of steam distillation is that it enables a compound or mixture of compounds to be distilled (and subsequently recovered) at a temperature substantially below that of the boiling point(s) of the individual constituent(s). Essential oils contain substances with boiling points up to 200°C or higher, including some that are solids at normal temperatures. In the presence of steam or boiling water, however, these substances are volatilized at a temperature close to 100°C at atmospheric pressure. The mixture of hot vapors will, if allowed to pass through a cooling system, condense to form a liquid in which the oil and water comprise two distinct layers. Most (but not all) essential oils are lighter than water and form the top layer. The steam that is used for the distillation is generated either within the steel vessel that contains the plant material (by boiling water contained at the base) or by an external boiler. The use of steam generated within the vessel requires that the leaf be supported above some boiling water by a grid. The water is heated either directly using a fire or by heat exchanger coils. The simplicity of the method makes it suitable for small-scale distillation of essential oils. If steam is generated, instead, by an external boiler, it is introduced into the base of the vessel via an open coil, jets or similar device(s). The advantages of this type of distillation are that it is relatively rapid and capable of greater control by the operator. The vessel can be emptied and recharged quickly and with the immediate reintroduction of steam there is no unnecessary delay in the commencement of the distillation process. Oils produced by this means are more likely to be of acceptable quality than those produced using the more direct method.

References:

- *Citrus & Allied Historical Archives*
- *FDA website: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=501.22*
- *AIB Technical Bulletin, November 1985*
- *Ames and Matthews, 1968, and Denny, 1991*