

# The Litman Aromatek Apparatus

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**W**ith few exceptions, the character of every flavor and perfume depends on its odor-producing ingredients. The flavor and fragrance industries use more than 3,000 materials. While the vast majority are individual chemicals, several hundred are natural extractives, each of which is made of many individual chemicals. It is not unusual to find several dozen components in a single flavor formula and many times more in a perfume.

In practice a perfume or a flavoring is the product of countless decisions, mostly organoleptic. Trial and error selection of the best ingredients at optimum levels is long and tedious, requiring many time-consuming trials before a satisfactory product is achieved, if at all. This situation presents a dilemma to creative flavorists and perfumers who feel pressured to increase productivity at the expense of creativity.

A solution to this problem may be found in the form of a method and apparatus for creating aromas in a direct manner free from complications due to the effects of volatility.

## **See the Litman Aromatek in Operation**

**A Litman Aromatek Apparatus will be at the International Perfumery Congress and available for delegates to study and to evaluate. Mr. Litman will demonstrate this apparatus and every delegate will have a chance to experience the possibilities for the creative use of this interesting and revolutionary new concept.**

**For full details on the program and registration, turn to page 17.**

## **Method and Apparatus**

The general method evolved from experiments to determine if it were possible to create aromas by mixing together vapors from several materials. It was reasoned that since aromas are perceived by their vapors, they could be created by vapors.

This led to an apparatus that operates on the principle that a volatile material if held in a confined container tends to produce a constant supply of vapor even as the vapor is slowly being swept up in a flowing odorless gas such as nitrogen. It was observed that materials having low volatility could be induced to increase their supply of vapors by applying mild heat. Essential oils or mixtures containing several ingredients of differing volatilities are handled by diffusing through them the odorless gas. In this way components of the mixture can be transported in proper proportions.

By regulating a high precision vernier gas control needle valve that feeds nitrogen through the headspace of each individual container, any desired volume of vapor is obtained. When several nitrogen-vapor mixtures are directed into a common mixing manifold, a composite aroma or fragrance is produced.

Any number of individual vapors can be mixed together in any combination and in any quantitative ratio. A given mixture can be held steady for as long as desired. Changes can be made quickly and as often as desired by adding, subtracting, increasing or decreasing any individual or combination of materials. Once the Vernier valve settings have been recorded, any mixture can be reconstructed at a future time.

The vapor stream of a particular combination of flavor materials can be diffused through an appropriate liquid medium to produce a flavored product that can be tasted. A fragrance combination can be diffused through alcohol for further testing. In either case, the vapor stream can be directed to a gas chromatograph that would quickly give an accurate report of the actual proportions of components known to be present.

**Figure 1**

Materials placed in bottles fitted with special caps tend to remain stable indefinitely due to the replacement of headspace oxygen by the nitrogen gas. Since there is nothing to clean up nor to discard, rare and expensive materials may be used in experimentation to their fullest potential.

### **Discussion**

When creating aromas by the traditional method of blending liquids, volatility becomes a thorny problem for both flavorist and perfumer but for different reasons. The flavorist would like to ignore volatility but cannot, while the perfumer would like to use it at every stage of development but finds it difficult to control.

The flavorist understands that as food is eaten the vigorous mixing and grinding action that occurs in the mouth releases the volatile fluids and entrapped gases. These aroma producing materials are picked up by gusts of air and carried to the olfactory region in the nasal cavity where they are perceived. It seems doubtful that volatility as a factor is significantly involved at this time.

The perfumer, on the other hand, strives to produce a mixture where each component carried by its own volatility reaches the nose at about the same time. To do this successfully many quantitative adjustments and fixatives must be employed.

For these reasons, work is greatly facilitated when volatility as a factor is eliminated from the equation if only during the creative stages of development. The Litman Aromatek Apparatus\* makes it possible to do this.

Figures 1 and 2 are photographs of a thirty cell Litman Aromatek Apparatus. It has been in service for more than a year creating aromas and masking agents. Its many applications are still

**Figure 2**

being discovered, i.e., for disclosing unique and useful combinations and for teaching the art of flavoring and perfuming.

While the operation of the apparatus is quite simple, its full value is realized only when in the hands of an experienced and imaginative artist. One of the procedures for creating aromas that is worth special mention requires that each component be an active member of the aroma complex; otherwise, it should not be used. Even before a specific vapor is entered into the common sniffing manifold the volume of nitrogen gas that is directed through its headspace is adjusted to an odor intensity that is "just recognizable," but no greater. When all test ingredients have been thus entered, the mixture is fine-tuned to the desired aroma by manipulating the needle valves, by elimination, simplification and replacement of certain components. Once a satisfactory aroma is achieved it can then be collected in a tasting medium or in other media if intended for use as a fragrance.

Vapor phase mixtures are best converted to liquid phase counterparts using gas chromatographic data or more directly but imprecisely from vernier valve settings.

### **Conclusion**

It was found that when working with this instrument the flavorists or perfumers can use their creative talents in the most efficient manner, producing much more constructive work than that obtained from traditional methods of working with mixed liquids. By eliminating volatility as the driving force during the creative stages of development and replacing it with controlled volumes of vapors new aromas are created more easily.

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\*The Litman Aromatek Apparatus, U.S. Patent Number 4520651.