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Perfumer's Notebook

By Calamondin

PERFUMES—EFFECT OF THE PRODUCT MEDIUM

The perfumer formulating a fragrance for a product usually has some odor profile in mind. The odor of the oil will suggest the general character of the fragrance, but changes as it is incorporated into the medium are the rule rather than the exception. Let us consider some reasons for such changes. They may occur immediately, within a short time, or on longer aging but here we are concerned with the changes in odor induced by the product without particular regard to time.

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Dilution is the first influencing factor. The temperature/volatility curve has been discussed previously.* That ratio is one which can be experimentally determined. We are now considering one which is not susceptible to physical measurement. It is the change in odor intensity with dilution, a ratio characteristic of or peculiar to each odorant. On dilution each odorant naturally undergoes a reduction in odor strength and a change in how the nose perceives the odor. The ratio of perceived odor strength to change in concentration varies widely for the palette of odor materials the perfumer uses. As a result a well balanced concentrate may be out of balance at use level. It explains how a fragrance compounded at the bench and seemingly possessing a good balance of topnote, contrast, and body may lose much of these features when diluted by the product.

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A second phenomenon, and one likely to have a greater influence on balance or profile than dilution, is reaction with the medium into which the perfume is incorporated. The reaction may be chemical in nature or it may be due to differential solubility of the perfume components in the product medium. An example is the performance of a perfume containing substantial amounts of phenyl ethyl alcohol in a product which has an appreciable content of water. The greater solubility of PEA in the water phase tends

* See April/May 1977 Perfumer & Flavorist Perfumer's Notebook.

to reduce its odor effect relative to that in the concentrate.

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The chemical reactions which can occur are numerous. For example, when perfumes containing phenyl acetic acid or a phenol, such as eugenol, are introduced into a weakly alkaline medium, as a toilet soap, significant change will occur. The alkalinity of the soap almost completely neutralizes the phenyl acetic acid with loss of odor. The weakly acidic eugenol is noted to display less intensity from soap than from the concentrate, or from a neutral medium. Some lactones are observed to be less odorous even in a weakly alkaline medium. Such changes as are mentioned are not due to aging but to a more or less immediate reaction between perfume and medium.

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Difference in the solubilities of the components of a perfume in a product is another cause of unexpected changes in odor from that indicated by the concentrate. When perfuming emulsions the odor profile may depend upon whether the emulsion is oil-in-water or water-in-oil, that is whether water or oil is the external phase. Somewhat different fragrance effects are observed if the two emulsion types are perfumed with a concentrate containing significant amounts of alcohols with some water solubility, such as phenyl ethyl alcohol, geraniol, linalol, etc. Some years ago an experimenter reported differences in odor when oil-in-water and water-in-oil emulsions were perfumed with a linalol/linalyl acetate blend. The differences were substantial and due to the different solubility of the alcohol and ester in the two phases.

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Soaps exhibit differences in their solvent action for odorant chemicals resulting in change of profile as a blend is introduced. The perfumer preparing to formulate a fragrance for a toilet soap will do well to first incorporate many single substances prior to compounding in order to compare odorants for their fragrance yield. This phenomenon is separate from the neutralization or enhancement of perfumery raw materials by the base odor of the product and from any neutralization of acidic components.

In addition to testing of individual perfume components in a product it is a useful technique

to incorporate skeleton blends on the way to a finished fragrance. Enhancement or suppression of odorant intensity will be more noticeable from simple mixtures.

Another phenomenon affecting the awareness of perfume components from a blend is that of association. A well known instance is hemiacetal formation when an alcohol and aldehyde combine loosely to reduce the odor intensity of each. Similarly the strength of a perfume aldehyde can be lessened by the presence of a non-perfume alcohol in the product formulation.

An additional factor which is widely recognized by perfumers is the influence of the base odor of the medium upon the fragrance of the compound. Little advice can be given other than to test both intended components and simple blends. It may be a difficult problem since a base odor can neutralize or enhance single component odors.



While on the subject of odor yield from products it seems appropriate to write a few words on the phenomenon of fixation. A fixative is generally considered to be a substance of low volatility which when added to a perfume will increase its life and maintain a more constant profile. Experiments which the writer has performed do show that nonodorous, high boiling substances, as the rosin derivatives Abalyn and Hercolyn, may retard perfume evaporation but do lower perfume intensity. Reduction in the evaporation rate of the perfume components occurs when the low volatility substance replaces the perfume on the surface of the product. More commonly the fixative is a substance such as a natural resin or gum which is an odorant itself and contributes to the fragrance. From the writer's experiments there seems to be little value in adding a non-odorous "fixative" to a perfume when that product in which it will be used contains oils, wax, or soap.

In soap amounts of Hercolyn up to equal amounts with the perfume did not extend the life of the fragrance over that with the perfume alone. The perfumer who is accustomed to use fixatives solely to increase perfume life should experiment to learn just how much value they have.



We have considered the phenomena of dilution, chemical reactions, and differences in solubility in the product as contributors to change of odor profile as a perfume is added to a product. Each of these factors has been examined as it affects the release of separate components from the surface of a product. Any may occur. Their existence emphasizes the need for perfumers to be informed of the chemical nature of the product they perfume. It also points to the need for testing of single odorants and simple blends at an early stage in formulation.