



Essential Oils: Yesterday, Today and Tomorrow

During the last 30 years, we have witnessed many changes within the essential oils industry. Essential oil production and processing are an important part of the global flavor and fragrance industry. Along with aroma chemicals, they constitute the creative building blocks for virtually all flavors and fragrances. Aromatherapy's use of essential oils is small, estimated at less than 0.5% of total oil production.

Because of their use, essential oil consumption often reflects consumer preferences in beverages, confectionery and related products, convenience foods, soaps and detergents, cosmetics, toiletries, and fine fragrances. Even with today's worldwide, instantaneous communications, adjusting the production of specific essential oils to meet current and anticipated needs continues to be a serious problem for the industry. Essential oil crops must be planted, nurtured, harvested and processed, which can take many months. Lavender and lavandin; clary sage; herb crops, including thyme, rosemary, basil, dill and oregano; and mint crops, including peppermint (*Mentha piperita*), spearmint (*Mentha spicata* and *Mentha cardiaca*) and cornmint (partially dementholized *Mentha arvensis*) are examples. Fortunately, this is not the case for most citrus oils, which are usually recovered when the fruit is processed into juice. The exceptions are bergamot oil and lime oil distilled. Weather conditions can and often do influence the production of essential oils, adding to the uncertainty and complexity of producing and trading these important raw materials.

During the early 1960s, a few large companies dominated the US essential oil market. Among these were Fritzsche Dodge & Olcott, The George Leuders Co., Magnus Maybee & Reynard, Norda Inc. and Ungerer & Co. With the exception of Ungerer & Co., which retains a successful flavor, fragrance and aroma chemical trade, all these companies have vanished through acquisitions and mergers. The smaller family companies of the period are today's most active importers, dealers and processors. Listed alphabetically, they are: Berje Inc., Citrus & Allied

Essences Ltd., the J. Manheimer Co. (which boasts important flavor and fragrance diversification), Polarome Inc. and Ungerer & Co. For accuracy purposes, it should be mentioned that there are a number of companies specializing in mint oils. They are: I.P. Callison & Sons Inc., the William Lehman Co., and A.M. Todd Co. (also active in citrus oils).

In the US, there are approximately 175 companies formulating flavors for resale, and about 125 compounding fragrances, also for resale. All of these companies, in addition to those that formulate flavors and fragrances for internal use, require suppliers for essential oils and aroma chemicals. These suppliers must provide ingredients of acceptable quality, including specifications, material safety data sheets, Kosher certification (when necessary) and certification of naturalness when required, all at a reasonable price and delivered in a timely fashion.

Mergers and acquisitions have been a part of the global flavor and fragrance industry for the last 40 years. Many well-known and respected companies have disappeared. In the US, in addition to those already mentioned, Polack, Schwartz and Van Ameringen Haebler were merged to create IFF. Polak Frutal Works (PFW), Fries & Fries, Food Materials, ChemFleur and Florasynth, to name a few, were all acquired by other companies within the industry.

In the UK, W.H. Hobbs & Co. and the Charles H. Zimmerman Co. merged and were eventually purchased by PFW UK Ltd., which was in turn purchased by the Hercules Chemical Co. Mallinkrodt Chemicals, which had acquired Fries & Fries along with Hercules, decided to merge their two flavor and fragrance companies to establish Tastemaker Inc. Three years ago, Tastemaker was purchased by Roche and merged into Givaudan Roure. Also in the UK, A. Boake Roberts, the W.J. Bush C. and Stafford Allen were merged into Bush Boake Allen, which has since been acquired by Union Camp, now a part of International Paper.

The rest of Europe has not been immune to the merger virus, particularly in

the Grasse, France area. The following companies have vanished: Antoine Chiris, Bertrand Freres, Lautier Fils, Mero Beuveau, Roure Bertrand Dupont, Sansoldi and Tombarel.

It appears that the flavor and fragrance industry is chasing itself in ever-smaller circles. One can only wonder whom, ultimately, will be the beneficiaries of the course many in our industry have chosen to steer. What impact will all these mergers and acquisitions have on the essential oil and aroma chemical segment of our industry? Certainly the purchasing policies of many multi-national and global companies will (and already have) start to change. As these firms harmonize the qualities they require on a global basis, they will ultimately reduce the number of their approved suppliers. This may prove easy for many commodity-like materials, but difficult for other products where transportation expenses, import duties and currency fluctuations can significantly add to the cost of a particular essential oil or aroma chemical. Those companies that have adopted a "just in time" inventory policy may find it difficult to obtain product that has to be shipped from a supplier to distances many thousands of miles away. Eventually, the large global companies will come to appreciate the service that the local dealers and manufacturers provide, and adjust their purchasing accordingly.

Another important development, during the last 20 years, has been the ascendancy of the People's Republic of China, an increasingly important manufacturer of aroma chemicals and producer of essential oils. Several factories produce many commonly used materials in China. These materials include vanillin, ethyl vanillin, heliotropine, phenyl ethyl alcohol, nitro, polycyclic and macrocyclic musks, coumarin, and cedarwood derivatives. Virtually all the cassia oil of acceptable quality is produced in China. This oil is an important ingredient in beverage flavors, and an important source or natural cinnamic aldehyde. Litsea cubeba is another essential oil exclusively produced in China.

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This oil has replaced lemongrass oil as the preferred starting material for isolating natural citral, an important flavor ingredient. Chinese cedarwood oil has proven to be a more economical starting material for the manufacture of cedarwood derivatives.

Although recently surpassed by India, China continues to be an important producer of crude *Mentha arvensis*, the starting material from which all natural L-menthol is derived. Other important Chinese essential oils include: star anise seed oil, citronella oil, oils of eucalyptus globulous and eucalyptus citriadora, garlic oil, geranium oil, ginger oil, spearmint, and tangerine oils.

Other important changes concern the classification of essential oils and aroma chemicals based on their flash point and other characteristics, for transportation purposes. All citrus oils, many herb oils, and a large number of aroma chemicals are hazardous due to their flash points, which fall below 141°F. Hazardous materials must be declared on the bill of lading, and labeled accordingly when shipped via truck, boat or air freight. Containers used for hazardous goods must be placed in order to conform to Department of Transportation and IMO regulations. Samples of hazardous materials cannot be sent via airmail, although most countries permit samples of these products, in acceptable quantities, to be shipped via air courier door to door. Unfortunately, Hong Kong and Singapore are examples of governments that require these samples be shipped via airfreight, which is extremely costly.

The most important development over the last 40 years has been the enormous effort expended by the global flavor and fragrance industry to ensure the safety of flavor and fragrance ingredients. The US was the first nation to recognize the problem, and, in 1960, Ben Oser and Richard Hall recommended that FEMA create its now-famous independent expert panel to evaluate the safety of flavor ingredients. These include essential oils, natural absolutes and extracts, oleoresins, and natural and nature-identical (artificial) aroma chemicals. FEMA's expert panel includes toxicologists, molecular biologists, biochemists and microbiologists. These experts, recruited from academia and teaching hospitals are currently culled from Canada, The Netherlands, UK and US. They meet three or four times a year to approve, reject, or request additional information and/or testing on the materials submitted for GRA affirmation. GRAS is a concept that is now accepted by most

health authorities worldwide. FEMA's expert panel is currently evaluating flavor ingredients submitted by IOFI. The GRAS list should exceed 2000 materials within three years. Since 1965, additions to this list have been published in the journal, Food Technology.

In 1966, RIFM was founded in the US to evaluate the safety of fragrance ingredients, using an independent expert panel modeled after FEMA's. Unlike FEMA, RIFM was established to provide safety information for the fragrance ingredients used on a global basis. RIFM's board of directors includes representatives from many of the leading multi-national fragrance companies, including Dragoco, Firmenich, Givaudan, IFF, Takasago, Robertet and Quest. RIFM's expert panel of nine scientists includes toxicologists, dermatologists, pathologists and zoologists, whose expertise is the environment. The members of RIFM's panel are from Germany, Japan, Switzerland, The Netherlands, UK and US. Monographs on approved materials are published in the journal, Food & Chemical Toxicology. Later this year, a special issue containing 70 monographs will be published.

In 1977, at the International Congress of Flavors, Fragrances & Essential Oils, IFEAT was created to encourage the use of essential oils and related materials, to foster an understanding among producers, manufacturers dealers and users, and to educate and inform members regarding all matters of interest. Ron Neal of Fuerst Dey Lawson developed the concept of IFEAT. He served as chairman of its first executive committee. Currently, IFEAT has over 200 members worldwide. The executive committee includes representatives hailing from Austria, China, France, Germany, India, Italy, Poland, Spain, UK and US. IFEAT works closely with the other international associations (IFRA, IOFI and RIFM), and maintains a close relationship with FEMA, FMA, BEOA, SIEMPA, PRODAROME, and other national trade associations, through its members, many of whom serve on the boards of directors of these organizations. At IFEAT's annual conferences, held in different parts of the world each year, speakers from these other associations are invited to make presentations on subjects considered important to the membership.

In the last 15 years, the use of essential oils and related natural materials for fragrance application has not increased proportionately with the demand for fragrance compounds. There are a number of reasons for this, including the following:

1. Demand and preference for low-cost ingredients
2. Need for price stability, consistent quality and reliable supply
3. Lack of interest by many, but not all, perfumers for using authentic essential oils and absolutes
4. Improved analytical technology, which has encouraged the use of reconstituted essential oils in perfumery
5. The large size and corporate structure of many of the multi-national fragrance companies, which encourages senior management to concentrate their efforts on finances, marketing and safety issues, delegating creativity and production responsibilities to others

Unlike fragrances, the use of essential oils and related natural materials in flavors has grown at approximately the same rate as the growth of the global flavor industry. The worldwide food and beverage industries are segmented, but also highly innovative. New products are continually introduced and accepted by consumers. Ethnic foods are increasingly popular in the US, and restaurants specializing in French, Italian, German, Greek and food can be found in almost all of our smaller cities. In the large metropolitan cities, including New York, Chicago, Los Angeles, San Francisco and Dallas, one can find Hungarian, Indian, Indonesian, Japanese, Korean, Mexican, Portuguese and Spanish restaurants. I was once asked to describe American cuisine, but I could respond, because we have borrowed from so many.

We live in the great age of "DINKS", double income, no kids. Young men and women are pursuing careers, marrying later, if at all, and beginning families in their 30s. Frozen convenience foods, often prepared in an ethnic style, are wholesome and flavorful, and have become a way of dining life for busy singles and young couples. As the standard of living improves in various parts of the world, the demand for beverages, confectionery products, baked goods, ice cream and frozen prepared foods will only grow. I believe it is here that we will find future growth in the use of flavors containing essential oils, spice oleoresins, natural extracts, and natural and nature-identical aroma chemicals.

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