

Symposium on supplies of natural and synthetic materials

A short symposium was held by the Essential Oil Association on the problems affecting manufacturers and their supplies of both natural and synthetic raw materials. Four reports were given on various aspects of this subject and are summarized below:

Aroma Chemical Manufacturing, by T. J. Plocek, Chem-Fleur, Inc.

Among the problems that manufacturers of aroma chemicals now face are the many new laws and regulations affecting chemical manufacturing as well as potential shortages in fuel and a variety of raw materials. Capital requirements, too, continue to increase, for both new equipment and the large inventories required to meet demand. Despite these increases in the cost of operating, consumers are naturally looking for lower prices.

Recent changes in job safety regulations seem to present the most immediate problems. Federal OSHA regulations are stringent; for instance, inspectors must by law assess fines for all safety violations (fines as high as \$1,000 for each violation) even if the violation is corrected on the spot. The OSHA Agency will, however, advise manufacturers who send a representative to the Agency's office without using the request as the occasion for an in-plant inspection.

Recently, because of the vinyl chloride scare, OSHA has concentrated on the use of industrial poisons. The Agency has proposed standards regarding worker exposure to such chemicals as toluene, cyclohexane, cumene, p-tert butyl toluene, methyl ethyl ketone, methyl n-amyl ketone, and others. Maximum exposure levels range from 10 to 300 ppm. Exposure limits will probably be set for some 400 chemicals over the next two years. The proposed regulations also specify steps for management to take in case exposure reaches one-half the permissible limit.

To be noted, too, is the recent decision of the Supreme Court which upheld the fine levied on the chief executive of a two-billion dollar corporation because of a health violation in the firm's plant. The Court stated that the executive's official responsibility included seeking and eliminating any violations of sanitary standards set up by the Food, Drug and Cosmetic Act. It is understood that such liability will not be limited to the Food, Drug and Cosmetic Act, but will extend to responsibility under a number of other Federal acts, including the Hazardous Substances Act and, perhaps, the Occupational Safety and Health Act (OSHA), too.

Federal, state, and local regulations relating to protection of the environment also affect our industry. New Jersey, for instance, has considered classifying any odor detectable off a company's premises as a pollutant. If such a regulation goes into effect, any person could file suit to stop the emanation of such an odor. The disruptive effect on our industry is obvious.

Federal water pollution measures are aimed at completely eliminating the discharge of pollutants into water streams by 1985. A series of interim regulations have been issued for the guidance of manufacturers. Another area of concern is the disposal of hazardous materials. It is not yet known what legislation will come out of government hearings on what constitutes hazardous material in waste and what is to be done about it.

The problems of aroma chemical manufacturers are

made even greater because of the great number of different products included in this industry. To cope with shortages as well as with safety and environmental regulations, manufacturers may have to develop different processes using different raw materials in order to produce certain aroma chemicals at all.

Petrochemical Supplies, by Thomas Parvis, Union Carbide Corp.

What can be expected as to the supply of certain basic petrochemical raw materials now used by the aroma chemicals industry? Important among these chemicals are benzene, the cumene and phenol derivatives, acetic acid/anhydride, ethylene oxide, and propylene and its derivatives.

Benzene currently appears to be in adequate supply with plans for capacity expansion. Price incentive is important for this chemical, or producers find it more profitable to channel their extraction operation into certain additives for gasoline.

Phenol derivatives include alpha methyl styrene, acetophenone, and to a large extent acetone. The last named may also be produced via isopropanol. Since these chemicals are by-products of phenol production, they depend upon an adequate demand for phenol and its derivatives in the auto, housing, and appliance industries. Again, especially in the case of acetophenone, price is a definite factor in the maintenance of supply.

The severe shortage of acetic acid/anhydride foreseen for 1976-77 should be eased by new expansion slated for 1977. But since high investment is necessary for production in this area, a 10 percent increase in prices over the next few years must be expected. There are several processes for making acetic acid, all of which depend on natural gas, naphtha, or both. So long as acid is available, the capacity for anhydride will hold up, but there is a tendency to put acid into derivatives such as acetic esters instead of on the merchant market.

Shortages of ethylene oxide may be experienced by the middle of 1976, but it is hoped that the situation will be relieved by 1978 due to market expansion and a new entry in the glycol market. Despite other factors, however, profitability will in the long run be the key to availability of this chemical. Price must justify the maintenance of present manufacturing plants and the cost of new plants. If new facilities are installed as needed, the industry hopes to achieve a balance between supply and demand, a balance which will continue into 1980. With adequate ethylene supplies, synthetic ethanol should remain available. Again price and profitability are the keys to production sufficient to meet demand.

There should be no problem with propylene and such derivatives as P.G. and acrolein in the foreseeable future. Expansions are planned to meet requirements. If prices hold firm, supplies should do the same.

Since the shortages of a few years ago, there seems to be a delicate balance between supply and demand for many petrochemicals. The country's overall economy and the industry's ability to reinvest are important weights and may determine which way the scale tips.

Aroma Chemicals, by Ron Fenn, International Flavors & Fragrances

October 1975 marked the second anniversary of the staggering increase in price of crude petroleum set by the Organization of Petroleum Exporting Countries (OPEC) to be paid by the rest of the world. Among the many resulting changes are those faced by the

aroma chemical industry.

In two short years we have gone from one extreme to the other: from shortages accompanied by increasing prices to ready availability and lower selling prices. Bad news traveled fast in these two years. The rate at which everyone rushed to buy everything in sight presented an awesome spectacle. Many speculators were quick to feed the "bad news" fires—it was good for their business. Previously good solid manufacturers became commodity speculators overnight; many purchased essential oils without even the benefit of sample. If the name was right, they bought it! You could always resell at a higher price. As a result, quality suffered dreadfully. The shining exception was lavandin oil. Although higher in price, it was of good quality because of the shortages of the traditional additives including linalool and linalyl acetate.

But toward the end of 1974, a distinct slackening in business was more than obvious, then—recession. As fashionable as it had been to stock up on every product during '74, overnight, it seemed, inventory became a dirty word, something not to have.

Then the exact reverse of '74 took place. Whereas in '74 despite the apparent shortage situation, more pounds of product were produced than consumed, in '75 fewer pounds were produced than were consumed. For a year that will be remembered for its shortages, sufficient material was produced in 1974 to cause the inventory excesses that almost every company had on entering 1975. As a result, virtually every aroma chemical manufacturer faced less than optimal production. His fixed expenses went up with energy and most other costs, except for a few raw materials. Improvement to facilities, especially those necessitated by safety considerations and environmental restrictions, all increased his costs of production. The situation was aggravated in specific cases as new capacity that had been initiated in answer to the shortage situation of 1974 began to come on stream.

Yet the purchasing section of some companies in our industry continued to think in terms of products being commodities, without proper attention to quality. One cent a pound less was felt to be of greater importance than quality of product or good service. An example of a product being driven down to rock bottom in price is amyl cinnamic aldehyde—now totally uninteresting to the traditional manufacturers.

The bright light on the horizon is that business activity picked up noticeably during the third quarter of 1975. The once embarrassing aroma chemical inventories were brought under control and for most customers reached a near normal level. Cash flow improved. No longer did customers order part-drum quantities for the exact amount to be used in specific orders in the house.

A look to the future—a very serious consideration is that most manufacturers are unhappy with current selling prices and the marginal profit they produce. This disposition does not make for a stable outlook. Costs of producing goods are rising; we have already experienced increased prices for many petrochemicals. Natural products are about at their bottom level and due to increased purchasing activity will undoubtedly move upwards. Energy will cost more. To take care of the public's increasing concern for the environment and to cope with the government's OSHA requirements will also add to the manufacturer's costs. In the past we looked to technical innovations to maintain ever-decreasing costs for major aroma chemicals. Those days, unfortunately seem to be over. While we still can expect technical innovations, it does not seem likely that

they will, overall, outweigh the cost problems outlined here. Competition continues to be keen, but in our industry there seems to be a relatively thin line between glut and shortage. The issue, it seems, is not whether prices will increase in 1976—but when.

Natural Products and Their Sources, by Eric Bruell, Polarome Manufacturing Company.

Our subject is the future supplies of natural raw materials for the essential oil industry. We might divide these raw materials roughly into three groups: 1) those that serve as raw materials in the production of isolates, competing head-on with synthetics and including citronella, lemongrass, menthol, and clove leaf; 2) those that can be replaced by synthetic oils, such as anis, bois de rose, fir needle, geranium, citrus oils, sandalwood, mint oils, and floral extractives; 3) those that are not threatened by replacements—at least for the present—including cedarwood, eucalyptus, guaiacwood, lavandin, ocotea, petitgrain, patchouli, vetiver, and ylang.

The common enemy of these naturals of all three categories is production cost. Any persistent upward trend beyond normal inflationary forces could cause the demise of a natural raw material.

As to the first group of naturals, in talking to growers in Guatemala, Java, and China, I found they fully expect to be able to compete with synthetic isolates. These people expect to hold but a small portion of the isolates market, about 25 percent, but they do expect to hold this fraction. These naturals can be grown abundantly like any other agricultural product, and there should be no shortage of essential oils to make isolates. But manufacturers in the United States and Europe may not have naturals for processing if the oil-producing countries fractionate or synthesize the oils themselves rather than exporting.

The second category of naturals covers a broad spectrum of food and fragrance products. The continuing development of synthetic replacements, spurred by the rising costs of the naturals, tends to discourage their cultivation. The supply in this category ranges from abundance as in the case of citrus oils, anis, geranium, cassia, and floral extractives to decreasing production as for sandalwood oil and bois de rose. Shortages should occur in production of these oils only because of man-made causes.

The same applies to natural oils in the third group. Recently, for instance, a vast quantity of patchouli came into the United States market with no customer in sight, apparently on speculation. Speculators in the field interpreted this to mean that someone was hoarding; they started buying. The final result was dropping prices and dropping production; as a consequence, a temporary shortage in patchouli can be expected a year from now. Such market movements have also affected petitgrain, ocotea, and vetiver.

At the present time, we have enough cumulative carryover and overproduction so that no shortages are in sight. Those concerned with natural raw materials would be well served to initiate continuing studies of specific oils with a view to long-range production plans. Vital considerations in our industry are balancing production with projected consumption and consideration of the fact that production costs and awareness of competition may force agricultural producers to industrialize right at the production centers.

Bottlenecks are a legitimate fear for the future. We can prevent these bottlenecks by discouraging "cornering" a product or "short selling." These practices tend to depress the market for everyone.