Natural Essential Oils: Current Trends in Production, Marketing and Demand

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In many respects the present state of world trade in natural essential oils is more critical than it has ever been in its long history. The growing impact of powerful economic forces on the world's flavour and fragrance industries has been forcing perfumers and flavourists to reappraise their formulations more critically than ever before under pressure from financial controllers. Indeed these technical specialists nowadays have to possess a much greater degree of cost-awareness than would have been thought remotely necessary even ten years ago. Real profit and trading margins have become steadily tighter and heavy long-term investment more and more risky, while the dampening influence of current world recessionary tendencies on cash flows has reduced the margin for errors of judgement virtually to vanishing point.

Successive recessions apart, however, it is the recent decade of inflation that the various participants in the trading chain would be most inclined to blame for the present difficulties confronting natural oils. Even those producers who are not dependent on fuel oil as a source of energy have nonetheless been substantially affected by the sharp oil price rises of the 1970s, in terms both of the general cost of living and of the specific effects on the prices of agricultural inputs such as fertilisers. In consequence, they have been forced either to reduce the amounts of agricultural and other inputs employed, with an attendant risk of reduced plant yields or lower product quality, or else to demand compensating increases in the ex-still prices of their products in order to restore their margins, even in those instances where the oils concerned have not been the primary source of their purchasing power. This pressure is probably least felt in those areas with the largest measure of dependence on subsistence agriculture, but there are few essential oils which come anywhere near being totally insulated from the effects of rising world costs. It is perhaps worth noting that the cost of firewood, widely used as a heat source, is in many areas no longer negligible as the incidence of scarcity increases. Producers who depend more for their needs on the market economy in general, and on fuel oil and costly fertilisers in particular, have felt the full effects of rising costs much more quickly.

Moreover, an increasing number of owners of originally very-low-cost equipment of traditional, rudimentary design are finding that replacement of worn-out parts of their equipment, or of entire stills, is no longer as relatively cheap an operation as it once was, particularly as in some cases traditional local fabrication skills are steadily disappearing. At the same time, equipment of modern design can be so expensive as to render the average traditional ex-still prices utterly uneconomic, even on the assumption of very long equipment life.

Production: Trends and Quality

To some extent, of course, these trends can be countered through fundamental changes in the production structure. A decline in the number of independent owners of essential oil stills in one or two areas is being offset by the development of cooperative-type ventures involving the establishment of centralised large-scale modern distilleries and of leasing arrangements under which centralised equipment is utilised by those owners of the raw materials who are no longer in a position to distill it in equipment wholly

 0272-2666/83/0003-7501$04.00/00

owned by them. In some cases, wealthier private entrepreneurs have invested in modern equipment and made arrangements to purchase the raw material outright from the farmers, supposedly at a price which represents a return comparable with that accruing to them when they were independent distillers.

In practice, however, not all such developments have proved as successful as they might have been. Cooperative ventures require the utmost care in planning and operation if a sufficient number of members is to be attracted, and their interest and support maintained, to render the operation viable over the pay-back period for the equipment, particularly where the members do not regard essential oils as their primary source of income, which, as already mentioned, is often the case. The high cost of modern equipment often requires a high rate of utilisation if a realistically short pay-back period and an acceptable internal rate of return is to be achieved. Prolonged disputes over leasing charges or other aspects of financial load-sharing can easily bring about the early demise of otherwise promising projects.

Equally important, of course, is the precondition that the adoption of modern equipment should not materially affect the basic technical and olfactory characteristics of the oil. The fact that an oil of consistent quality, free from adulteration can be produced under modern conditions will not of itself guarantee the oil a market. Perfumers and flavourists must be satisfied that the oil is sufficiently close in basic character to the corresponding oil produced in traditional equipment, avoiding problems of the presence of adulterants or foreign matter, and of the need for reformulation of their products. Reformulation can be both expensive and risky, particularly where customer requirements are critical. Careful technical optimisation of the process is necessary to ensure that these requirements are met. Again experience suggests that it is all too easy not to devote sufficient resources to this end.

It is, moreover, seldom advantageous for the producers to attempt to over-exploit modern equipment in attempts to boost their revenue by acquiring the additional equipment needed for refining or otherwise re-processing of the oil. In spite of a gradual transfer of refining technology away from the industrialised countries, the fact remains that most blenders prefer their raw materials to be in as basic a form as possible in order to give them the maximum latitude for modifying them in accordance with their specific requirements. Even where they are prepared to purchase ready-modified, deterpenated oils, they remain much more inclined to resort to the major established processors with whose products they have been familiar over a long period of time. Finally, remember in certain prominent essential oil producing countries, for example Indonesia, production costs are about as low as they can possibly be, and even efficiently-run modern enterprises will not be able to achieve any significant price advantage, or even price equality, *vis-à-vis* traditional methods.

However, joint production ventures, if carefully set up and managed, may in the long run prove to be the most promising means of minimising the decline in production of many natural essential oils. The traditional farmer-distiller is most unlikely to disappear completely, however, and will almost certainly continue to play a rôle in spite of the economic difficulties.

Before leaving the specific problems of the producers, it is also worth mentioning that in one or two producing countries the pressures in favour of an increase in the area of land available for food production have had the effect of reducing appreciably the area available for essential-oil-bearing crops and in general have relegated essential oil production and export to a lower level of national priority. Guatemala is a case in point. This is a tendency which could increase, although the likely effects on the availability of the various essential oils cannot be predicted with any certainty as the impact of such policies will vary greatly from country to country. In any case there are prospects in some instances of potential new producers entering the market and making up any deficits.

The Trading Structure

Between the two extreme ends of the marketing chain, the various intermediaries have been exposed to the entire impact of inflationary pressures. Of the various intermediate costs, shipping costs have inevitably borne the full brunt of oil price rises, soaring interest rates have totally transformed the cost of warehousing large stocks, and insurance rates have risen substantially, in consequence of which the margin between FOB and CIF prices, let alone between ex-still and user prices, has increased substantially. In spite of periodic falls in interest rates, most intermediaries appear to be working on the assumption that the average long-term level of interest rates will be appreciably higher

than it used to be.

One effect of this has been a noticeable tendency for the number of links in the marketing chain to diminish as users have sought to minimise the impact of cumulative cost margins by means of as direct a form of trading as is feasible. However, true direct trading in its ultimate sense is seldom a realistic possibility. Such financial advantages as a reduction in the number of trading links is expected to bring have often been measurably offset by a reduction in the efficiency and resilience of the trading system as a whole as its ability to respond promptly to the effects of supply and demand fluctuations is reduced. Although an efficient marketing network offers no guarantee against severe price fluctuations brought about by supply shortages or, less frequently, sudden surges in demand, the evidence suggests that the incidence of price fluctuations is increased and intensified under conditions of a more restricted and less flexible market structure. In this respect at least, the recent trend towards the by-passing of dealers, brokers and produce merchants, whether located in *entrepôts* such as Singapore or in the importing countries, can quite easily be counter productive and make an already difficult situation worse.

Synthetics Usage

At the user end of the essential oils market, the increasing cost of compounding has over the years brought about a very sharp decline in the number of major end product manufacturers who undertake their own compounding. The position of the large perfume and flavour compounding companies, particularly multinationals, has been correspondingly strengthened. At the same time, virtually all major compounding and processing houses have indicated that in recent years the growing financial constraints imposed upon end-users by world economic conditions generally have brought about demands for sharp reductions in the cost of perfume and flavour compounds, not only in real terms (i.e., allowing for inflation), but often in actual money terms.

The effect of such demands is that of a progressive reduction on the part of perfumers in their dependence on natural essential oils, particularly the more expensive ones, and an increase in the proportion of relatively cheap synthetic ingredients used to give a desired effect. A sharp downward pressure on the prices of natural essential oils, in combination with the upward pressures at the producer end of the chain, is tending to place the future of an increasing number of oils in jeopardy.

Unfortunately, the competitive pressure on natural essential oils from synthetic perfumery and flavouring materials is not moderating, in spite of the long-standing and widespread expectation that successive increases in the world price of petroleum oil would be rapidly and fully reflected in the prices of petroleum-based perfumery and flavouring isolates. In reality it would appear that the petroleum industry has held down the prices of this particular group of derived products and allowed certain other groups of products, presumably those with rather lower price-elasticity of demand than that of synthetic perfumery and flavouring materials, to carry the main burden. In consequence, although the prices of petroleum-based synthetics have certainly increased during the nine years since the first of the major oil price rises, their competitiveness and comparative price stability *vis-à-vis* natural essential oils has not been affected sufficiently to bring about an appreciable resurgence in use of natural oils. Moreover, in the present comparatively depressed state of the petroleum oil market, appreciable increases in the price of synthetics in the near future seem unlikely.

Similar observations apply to the many synthetics derived from turpentine, such as menthol and the rose alcohols. Although the cost of producing turpentine is likely to increase in line with world costs, it is produced from a renewable resource which is less likely to be prone to ever-increasing scarcity in the long run, and it does not enjoy the equivalent of an OPEC. Furthermore, it is in part a by-product, considerable quantities being produced during the "Kraft" sulphate wood-pulping process. Although technical modifications in pulping practices may cause the offtake of turpentine actually to decrease, there is every prospect that any increase in the cost of producing turpentine will be no greater than, and probably less than, inflation rates generally. The elasticity of long-term supply is such as to ensure that any shortages that occur induce, through the price mechanism, longer-term increases in supply and a consequent long-term price pattern that in part reflects the potential abundance of the product. None of this is to deny that there have been supply problems in recent years, but the long-term outlook is favourable.

It is, of course, also well known that the quality of very many natural essential oils is more variable than that of many synthetics. Natural

oils are prone to sharper fluctuations in price levels than are synthetics on account of the effect of crop failures, other unpredictable influences, and the greater lack of knowledge on the part of all concerned of developments elsewhere in the production and marketing chains. The relative degree of uncertainty and unpredictability these influences bring about are strongly at variance with the perfumer's constant need for regular supplies of even quality. In consequence perfumers feel themselves under increasing pressure to abandon or substantially reduce their former dependence on this or that natural oil, whatever its acknowledged advantages over the synthetic competition, in order to insure themselves against possible embarrassment and potential loss of customers.

In spite of these adverse forces, however, the volume of natural essential oils traded on the international market is still considerable, and a few influences still work in their favour. Firstly, certain types of oil stubbornly ward off all attempts at synthesis at a reasonable cost; woody-type oils such as those of patchouli and vetiver are good examples, but there are many others. Other oils, either by virtue of their being by-products or on account of their being technically simple to produce, remain very cheap in relation to the synthetic competition and continue to hold their own, an obvious example being orange oil.

Also working to the advantage of a number of natural oils is the relentless advance of legislation in relation to the use of synthetic ingredients in final products. This advantage operates more in favour of flavouring oils than perfumery oils as it is in the flavour field that there has been the most pressure for a tightening of the food and drug laws. Although the rationale behind a number of the new regulations is far from obvious, the general trend is likely to continue. There may to some extent be an underlying conviction that the livelihoods of producers of natural products should as far as possible be protected, but this is probably not a major factor. Health considerations certainly play a major part but can also work against natural products. Another major reason is an underlying public preference for "natural" products. Even in the perfumery field, there are certain types of products in which this preference has been evident, for example in herbal-type bath preparations.

Prospects for Selected Oils

The current standing of a selection of natural essential oils and the likely prospects for them will now be briefly considered.

The oils of *patchouli* and *vetiver* are among the perfumer's most important natural oils, particularly in the heavier, woody types of perfume or where a strong foundation with good fixative properties is required. Both are virtually impossible to synthesise accurately, and although synthetic patchoulols or vetiveryl acetates have been produced in very small quantities by one or two companies, they are very expensive, are not traded, and are only very approximate representations of their natural equivalents.

Yet world consumption of neither oil is growing appreciably. One formerly major user of patchouli oil recently and without warning dropped the oil altogether from an entire line of products. The demand for vetiver oil has been no better than static. In both there have been periodic price fluctuations of an unacceptably severe degree and, in the case of vetiver oil, a degree of artificial price fixing which has alienated many users.

Adulteration has for some years been a problem with patchouli oil, and although very many perfumers have adjusted to low levels of adulteration, periodic higher levels continue to cause concern. More recently vetiver oil has also come in for some criticism in this regard although the practice is not yet as widespread.

For many years it was assumed that these oils would never be discarded, or dependence on them reduced, so unique were their properties considered in relation to the whole range of available perfumery materials. Now, however, there are widespread reports of a progressive reduction in the proportions of these oils used in the relevant formulations, use being made instead of cheaper woody-type oils such as those of cedarwood and guaiacwood. There are no suitable synthetic alternatives. Although the technical scope for substitution or extension is at present limited, the recent history of the oils of patchouli and vetiver illustrates clearly the ultimate vulnerability of even the most deeply-entrenched natural oils. For neither oil is there considered to be any appreciable opportunity for new producers, although in the case of vetiver oil the decline of production in Réunion could possibly eventually create a very limited outlet for a new producer, but only if the oil were of very high quality, comparable with the Bourbon oil.

The oils of *lemongrass* and *citronella* offer probably the most classic illustration of the historic decline in worldwide use of high-volume,

relatively-low-cost oils. Both oils have always had and continue to have perfumery uses in their own right, although this applies more to oils from certain sources, for example, the "Ceylon-type" citronella oil from Sri Lanka. While there has been a decline of usage in cheap soaps, detergents, and household and industrial products of a utility nature, the main area of decline has unquestionably occurred in the extraction of derivatives such as citral, the ionones and vitamins, in the case of lemongrass oil; and geraniol, citronellal, citronellol, hydroxycitronellal and so forth, in the case of citronella oil.

Some perfumers continue to have a definite preference for some of the derivatives of the natural oils rather than for the equivalent isolates of turpentine or petroleum oil, particularly in the case of hydroxycitronellal. However, the prices of the synthetics are generally sufficiently low for the olfactive advantages of the natural products to be required only in critical applications.

The fortunes of lemongrass oil have suffered from a combination of irregularities in supplies from India, which arise mainly from the barter trading agreement between India and the Soviet Union, and of the steady decline in production in Guatemala. Citronella oil has fared rather less badly in this respect. Attempts are being made in Indonesia to cultivate and distill an improved strain of citronella, but although this might have a marginal effect on the oil's fortunes, it is most unlikely to transform them.

In contrast with the oils of lemongrass and citronella, the *eucalyptus* oils have fared better. Most under threat from synthetics is *E. citriodora* oil, consumption of which had in fact fallen quite appreciably over the years, although a number of users have a strong preference for hydroxycitronellal *ex-E. citrodora* than for that from other sources. It is not now possible to produce this oil at a price which holds the synthetic competition permanently at arms length, but it has not suffered to the same proportionate degree as has citronella oil. Prospects for new producers, however, seem scarcely any better than in the cases of lemongrass oil and citronella oil, for Brazil and China seem fully capable of meeting demand for the foreseeable future.

Demand for the cineole-rich oils (such as oil of *E. globulus*), however—particularly those conforming to international and Pharmacopoeia standards—seems buoyant. These oils have been comparatively free from undue price fluctuations since 1975. Rising costs on the Iberian peninsula have given the Chinese oils a competitive edge but the Iberian oils continue to hold their own in many areas, mainly on account of their quality, and there appears to be more than adequate supply to meet the demand. Natural cineole is cheap in comparison with the alternatives but, even so, many users insist on the importance of high cineole content in these oils. There have been several instances of consignments of relatively low cineole content, particularly in southern African oils of *E. smithii*, which are unrectified and tend to contain undesirable constituents which impart off-odours.

While existing suppliers appear to be keeping abreast with demand, it is possible that in the longer term a new producer of an oil of consistently very high cineole content would find a regular market for his product, although not in large volumes unless supplies from one of the major exporters were suddenly to decrease. There has also been a little trade interest in eucalyptus oils rich in phellandrene and piperitone, such as *E. dives*, but probably not sufficient to warrant the entry of new producers.

Compared with many natural essential oils, the main citrus oils appear to enjoy favourable prospects. *Orange oil* in particular remains cheap and brooks no competition in the flavour field, and although as a source of d-limonene the situation is less favourable, this is not often the major outlet for the oil. *Lemon oil* is a more expensive product and faces many substitutes on the perfumery side, particularly from synthetic citrals, but in the flavouring industry it continues fully to hold its own in spite of periodic high prices and quality shortcomings, and there is no apparent prospect of severe long-term shortages.

The growth in demand for *lime oil* has if anything flattened out after a period of sustained growth but the market continues to be buoyant. High prices have been a periodic source of concern but there is little challenge from synthetics. Users instead have recourse to cheap and abundant lime terpenes as a partial alternative. Although it is possible that a new producer of a good-quality but inexpensive lime oil would find a market, the prospects are in general insufficiently good for new production to be an attractive proposition.

On the other hand, there does appear to be some small scope for new suppliers of *bitter orange oil*, although this oil is only produced in small quantities, albeit at a high price. It has been periodically in short supply, and the threat

from synthetics has grown. It would appear that some former suppliers of bitter orange oil have been replanting their plantations with varieties of orange suitable for the fresh fruit trade and in consequence the production base has shrunk. The total effect of bitter orange oil in perfumery and flavouring applications is difficult to synthesise accurately, and the oil continues to be highly regarded by users generally. Recent tentative plans to resume production of bitter orange oil in Northern Tanzania appear to have come to nothing, and there is every prospect that a new producer of good quality oil would be welcomed.

The fortunes of one particularly problematic group of essential oils, namely those of a basically floral character, have fluctuated over the years. *Geranium oil* has from time to time been in short supply but there appears to have been some stabilization in the market in recent times. In particular, production in Rèunion, which was in decline for a period of time, seems now to have stabilised, while the quality of Chinese oil appears to be well liked in the trade, even though neither it nor the other available geranium oils quite match the Bourbon oil. However, synthetics can in a number of cases provide geranium-type effects cheaply. Unless production were to fall suddenly and substantially below current levels—notwithstanding the failure of Egypt to make the expected impact on the market, as a result both of the incidence of disease and of the Chinese low-price policy which has significantly influenced the oil's fortunes—there is no real prospect for a new producer.

On the other hand there may be *prima facie* prospects for new production of one or two other oils in this group such as those of *jasmine* and *rose*. Rose oil has been scarce from time to time and its special character is difficult to synthesise, even at a cost equivalent to the oil's very high price. There would probably be an outlet for smallish quantities of a new good quality oil provided that its price is appreciably below that of the Balkan oils. There have also been shortages of jasmine oil and absolute and new sources are needed, although there can be no doubt that jasmine products are notoriously difficult to produce at the required high level of quality without experienced assistance. Similar comments apply to *neroli oil*, which has often been in short supply but which could not be produced in a new location except under very tightly-controlled conditions.

The market prospects for essential oils distilled from spices, herbs and certain vegetables appear on the whole to be reasonably favourable, although the prospects for new producers vary greatly according to the oil. Of the many oils in this group, those with which frequent supply problems hold at least some prospect for new producers include *basil oil*, *coriander seed oil* and *caraway seed oil*, while *onion oil* and *garlic oil* have also been regular sources of interest in recent years. In spite of the fact that world consumption of some of these oils is of a low order, their unit values tend to be relatively high. In the case of onion and garlic oils, however, stringent quality specifications have to be met before the oils can be successfully marketed.

Conclusion

The foregoing analysis is of course in no way meant to be exhaustive, but is intended to illustrate that, although the picture is uneven, in many respects existing and potential producers of natural essential oils are faced with an uphill struggle in the years ahead. Increasingly it will be of paramount importance for producers, especially those about to enter the market for the first time, or those attempting to produce familiar oils in untried locations, to maintain very close liaison with interested buyers at all stages of their production plans. All trade requirements in respect of quality, packaging, delivery dates, documentation and so forth must be met from the very outset. It is also important that new producers appreciate that attempts to market their product via an excessively short marketing chain can easily prove counterproductive.

Traditional intermediaries continue to play a useful and sometimes vital rôle in the trade, in spite of the impact of rising costs at every stage of the chain. On the other hand, producers of traditional, long-established essential oils may increasingly find that a growing market exists in the Third World for locally-produced perfumery and favouring products. It may be possible to sell at more economic prices in these markets in view of the lower incidence of those freight and other intermediate costs and mark-ups to which essential oils sold in the major industrial countries are heavily, but inevitably, subject.

Acknowledgement

This paper was presented at the World Council Meeting of the International Federation of Essential Oils and Aroma Trades (IFEAT) held in London, October 4-7, 1982.