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THE FIRST TRULY INDEPENDENT WATCHDOG FOR THOSE
WORKING WITH NATURAL AROMATIC MATERIALS

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2008:

A Bad Year for Natural Aromatic Ingredients. A Good Year for Industry Consultants & Ingredient Clerks.

Editorial.

2008 was a something of a turning-point. Arguably, Cropwatch did less over these past 12 months than in previous years, but saw its support-base increase considerably! There's a lesson to be learned there, the trouble is we are not quite sure what it is! Much of the on-going effort was expended writing articles & in the construction of data-bases (see Cropwatch Files section of website) including bibliographies of published articles, abstracts and sometimes critical comments from Cropwatch on relevant topics, such as threatened species (Rosewood, Frankincense etc.). Cropwatch also gave a lecture entitled "Natural Products Regulation: Politics vs. Science" to the BDIH at Mannheim, Germany on Nov 6th 2008 but has not received a reply regarding permission to post the lecture on its website. This is the first time this situation has come about (a Power Point copy of the lecture is available from Cropwatch on request). In 2008 more generally:

1. Preparing the ground for the effective elimination from general use of even more natural aromatic ingredients took a number of different directions over 2008. Under REACH (Registration, Evaluation Authorisation and Restriction of Chemical Substances) as embodied in Regulation (EC) No 1907/2006, we suffered **The REACH Pre-registration Exercise** for 'phase-in substances' (read: substances listed in the European Inventory of Chemical Substances). This procedure was blighted by the fact that the number of firms & registrations had been underestimated by the under-funded, Helsinki-based European Chemical Agency (ECHA) and the EU Commission, by a factor of some fifteen times. This resulted in the intermittent availability of the REACH-IT platform, and its interminable slow-working during office hours, when it was available. The miscalculation probably arose because the Commission had wrongly focused on the chemical industry to predict pre-registration numbers, whereas in the event, a whole variety of chemical-using concerns have pre-registered phase-in

substances. As it was, smaller aroma concerns were subject to financial discrimination in the Pre-Registration Exercise, as they were stretched to breaking point in attempting to come to grips with the required IT costs & resources required to effect pre-registration, via the user-unfriendly REACH-IT platform & associated software. And so they hired experts & consultants in droves; the latter being the only financial winners in this situation. Even so, many concerns claim that due to the inefficiency, complexity and frequent unavailability of the REACH-IT platform from to its many crashes, they were unable to complete the pre-registration process within the time limit, these aggravations leading to a campaign for an extension of the limit by the Chemical Bureau Association, amongst others. Ultimately, of course, the REACH process will lead to the elimination of many currently-used aromatic materials, as industry will inevitably be unable to support the cost of providing the extensive safety data necessary for full registration of all presently used individual 'chemical' ingredients. The regulatory pressure against the use of many natural ingredients, which will be an implied consequence of the REACH exercise, suits the powerful businessmen who run the aroma industry, and who view the difficult availability and price volatility of natural aromatic ingredients as a nuisance, caring little about the disappearance of naturals in what is left of the already dumbed-down perfumery art. As we have seen in the industry trade press reports earlier this year, new young perfumers hired by some of the largest aroma concerns, are apparently being exclusively trained in (totally) synthetic perfumery; Cropwatch thinks this more or less embodies the present attitude of the major fragrance compound providers towards naturals.

2. The corporate influence (read: funding) on the over-influential toxicology juggernaut, represented by the **RIFM / IFRA / REXPAN** sisterly combination, is showing its previously noted schizophrenic approach to natural aromatic products. **On the one hand**, in IFRA's Information Letter No 815, IFRA have admitted what we have already suspected: that the introduction of the corporate-science-contrived Quantitative Risk Assessment (QRA) system for the estimation of sensitizer potency, is too expensive to operate, even for IFRA. The consequence is that IFRA are having to bail out of applying the QRA system to two more natural complex substances: styrax (*Liquidambar* spp.) and opoponax (which any economic botanist will confirm mainly derives from *Commiphora guidottii* (Chiov), in spite of contrary botanical origin information from IFRA and the EU). IFRA are finally coming clean about their inability to cope with the expert botanical verification necessary for ingredient testing, the implied audit tracking of raw material lots, and the analytical chemistry involved to establish raw material authenticity - although these same failings clearly apply to much of the RIFM legacy of previous ingredient toxicological investigation, as Cropwatch has been saying for years. IFRA make clear that lack of industrial funding/expertise will lead to the prohibition of these materials in its Standards. It is clear then, that IFRA no longer represent the whole perfumery spectrum in all its diversity, but rather the narrower interests of a handful of powerful aroma companies, and there is a vacancy for a replacement organisation with a wider vision and

scientific capability, with the brief to defend aroma ingredient use against the march of over-zealous health & safety legislators.

In contrast to abandoning support for certain individual complex natural products, IFRA are reportedly trying to demonstrate an unassailable position of leadership of the perfumery scene by assembling a corporate task force to define natural & organic perfumes (*Cosmetics & Toiletries* website, 6th Jan 2009). If this story is true, it can be only be seen as a breathtaking piece of supreme irony. IFRA has arguably done more than anyone else to inhibit the art of natural perfumery and make formulation almost completely impossible, by their progressive bans & restrictions of natural ingredients, which now extend to some 150 ingredients, and by introduction of the intensely bureaucratic QRA system. In any case Natural Perfumes have already been defined (Natural Perfumers Guild 2008), and hopefully no-one will be interested the second-hand opinions of IFRA's task force members. As it is, the effects from the progressive introduction of new IFRA Standards, & continual passage of EU cosmetic regulations (often underpinned by toxicological evidence from RIFM), has resulted in the removal of many of the original great classic perfumes from the market, for reformulation for regulatory compliance purposes. Reintroduced versions of these classics (often minus key ingredients such as oakmoss & bergamot) are invariably pale imitations of their former selves, this situation leading to considerable consumer criticism, irritation and internet comment. Since 2002, global perfume sales have been pretty-well stagnant, but this is largely industry's fault, by trying to promote many frankly appalling perfumes with a higher synthetics content (some of which even managed to make drain-cleaner look attractive) via a policy of Z-list celebrity-endorsement. If the perfume trade wants to put the art back in perfumery, it needs to re-appraise its economic support for toxicology-based organisations who, in turn, feed their over-precautious ingredient safety data to the cosmetics regulators, and they need to think more about financing people prepared to defend perfumery against the raging sea of unnecessary & damaging safety restrictions presently engulfing us.

3. The third development of concern really follows on from the above: the market demand for natural cosmetics. Warnings that the unsustainable demand for natural ingredients may exceed supply for many basic cosmetic raw materials goes unheeded in the scramble to tap the €1.4 billion natural cosmetics market in Europe, not to mention the additional value of the US market. Numerous self-appointed **Natural & Organic Cosmetic Certifying Organisations** are springing up to cash-in on this big financial opportunity. These people are big on publicity and marketing at trade conferences, but they have clearly revealed a paucity of knowledge & experience about the involved science, technology, commercial practice, market forces & economic botany of natural cosmetic materials – pre-requisite knowledge that they really do need to have, in order to be generally viewed as 'fit for purpose'.

Those who have travelled the world a little, may have already used 100% natural and organic cosmetics in the form of locally used ethnobotanicals in Africa, India,

S.E. Asia and other places – for example boiling *Sapindus mukorossi* soapnut shells with water to produce a liquid containing foaming saponins for washing/shampooing/laundry purposes, or using the oil of *Butyrospermum parkii* (Shea butter) for partial protection against the sun's UVB rays. These products, however, are generally too unsophisticated for Western consumer tastes, who need their cosmetics ready-to-use & featuring associated image-promotion, brand identity, attractive packaging, labeling and the whole deal. The 'ethical greens' of the cosmetics industry (*Aveda*, *Natura*, *Origins*, *Decleor*, *l'Occitane*, *Lush* etc.) which prominently feature a high natural product content in their retailed commodities, have been undeniably successful in exploiting this consumer niche.

In Section 5 below we look further at the proposals to establish a set of criteria for Western-industry produced versions of natural & organic cosmetics, as set out on various websites. Cropwatch is concerned that larger amalgamations of these certifying groups are threatening the support base, established territory and good work of those longer established individual certifying Natural & Organic Products organisations which have shown a wider brief than just making a quick buck. Here Cropwatch would include organisations like the German-based BDIH, which at least can demonstrate a commendable educational workshop record for its membership, and which has also attempted to modify the shape of European REACH legislation as regards the treatment of Natural Products. However even this particular organisation is having to huddle together with others to form a larger power base in an attempt to cling on to sponsoring companies & territory (see below) - behind the scenes it is completely 'dog-eat-dog' at the moment.

Although designed to impress the would-be cosmetics consumer, hopefully industry's natural perfume buyers will take no notice of these agencies and their extraneous seals of approval either, since the latter have no significance under national & state law, and anyway, (natural) fragrance & ingredient manufacturers & traders will provide, on demand, their own internal Certificate of Naturalness to any trade customer that needs one. What happens in practice is that the fragrance buyer usually briefs core fragrance providers in the first place, indicating a specific percentage of natural ingredients required in submissions against specific briefs, for claims purposes etc. The decider, therefore, is likely to be much more with the potential natural cosmetics consumer, who has to decide whether the seals or symbols of compliance to the standards of these organisations represent anything worthwhile, or not.

Reference: Natural Perfumers Guild (2008) – see “Defining Natural Perfumery and Recognizing the Need for Self Regulation: A Position Paper.” at <http://naturalperfumers.com/NPG-position-paper-definition.pdf>

1. The REACH Pre-registration Exercise – an Autopsy.

The free REACH pre-registration period for 'phase-in substances' (read: any chemical / natural biological complex substance listed in the European Inventory of Chemical Substances, and other valid substances) ran from 1st June to 1st December 2008. REACH applies to all chemicals & chemical mixtures

manufactured in, or exported into Europe, in quantities over 1 ton/annum, and failure to have pre-registered (in theory at least) will make trading individual phase-in substances at over 1 ton/annum illegal, and render manufacturers subject to fines. This is *unless* they are a downstream of an importer who has already pre-registered the material, or provided they now submit a full safety dossier and pay the appropriate registration fee. Customs & Excise UK are pledged to impound imported customer-bound unregistered materials – pretty difficult you might think, in view of the recent UK job losses affecting Customs & Excise, which include UK port areas, and the disruption to dock distribution areas & shipping it might cause.

Institutions such as **Greenpeace** and large corporates such as **Proctor & Gamble** have been historically prominent in supporting REACH proposals, but ironically, no exemption has been obtained for natural complex ingredients such as essential oils, so important to the lifestyles of many Greenpeace supporters. Curiously, pre-registration did not apply to ‘chemicals’ used in food or animal feed flavourings or for ingredients used for a veterinary or pharmaceutical purpose. Given the EU’s record of a regulatory vendetta against natural ingredients in cosmetics, the failure to include flavourings within the scope of REACH will hardly surprise many European consumers.

Pre-registration submissions of phase-in substances had to be made through the REACH-IT portal, and if you read through the main pages of the ECHA website, the spin therein might lead you to believe all went smoothly. In fact the inadequacy of the offered technology meant that the site for pre-registration was six weeks late in opening, was prone to continuous crashes & interruptions ‘for upgrading’, and worked so slowly most of the time that it failed to cope adequately with demand volumes. Further, the legal status surrounding many of the REACH concepts appears confused – for example no clear definition of an importer was provided. Cases of bullying of small ingredient exporters outside the EU by certain large aroma concerns have come to Cropwatch’s attention. The legal advisers of these concerns are seemingly set on taking advantage of the loopholes & sloppy legal construction of the REACH legislation. Hopefully we may be able to provide more details on this matter soon.

What now? The Reach-IT portal re-opened on 5th January 2009 for late registrations for new companies, and it would appear that some REACH consultants regard this, by employing some undisclosed maneuvering operations, as a potential loophole to enable late registrations in general. The Pre-registration Process was only the beginning of the REACH exercise, as industries technical representatives now huddle together in Substance Information Exchange Forums (SIEFS) to share information & reduce the costs of providing the necessary safety information on individual ingredients required for the very demanding further stages of full REACH registration (the higher the tonnage band, the more extensive the data required). The European Federation of Essential Oils (EFEO) has calculated that 150 natural complex substances are/will be imported at over 1 ton/annum and will require registering, and that

these can be sub-divided into 20 groups with similar constituents. The European Flavour & Fragrance Association (EFFA) & EFEO have formed four consortia for the exchange of data, and to minimize testing costs, for citrus, mint, & safrole-containing natural complex substances, and for vetiver oil (the latter being an example of a natural complex material where some components are allegedly unidentified). Cropwatch predicts however, that many small EU aroma companies will be unable to commit the time, resources & capital required for consortia participation with a view to full ingredient registration, and will pull out of the business before full registration. We thus share Bleimann's future vision of an aroma industry where just a few large corporates with stripped down product inventories are eventually left in business (see *Cropwatch Newsletter* Jan 2008). If this comes about, Cropwatch believes part of the blame can be put firmly at the EU Commission's door, as it consistently fails to understand the socio-economic fall-out of its own program of over-cautious health & safety legislation.

2. Sandalwood – A Critical View of Developments.

by Tony Burfield Dec. 2008.

[Slightly modified from a feature first published on www.aromaconnection.org 15th Dec 2008].

The fact that some Sandalwood species are under threat is an inconvenient truth ignored by many cosmetic companies & essential oil traders. Four *Santalum* (Sandalwood) species are present in the IUCN Red List 2008, including the extinct *Santalum fernandezianum*. The more familiar *Santalum album* L. is one of the remaining three, being assessed as Vulnerable in 1998, but a more detailed breakdown of the eco-status of individual *Santalum* species from various geographical locations, with ancillary notes, is available on the Cropwatch's website, in the A-Z Section of the latest update of the Threatened Aromatics Plants data-base, at <http://www.cropwatch.org/Threatened%20Aromatic%20Species%20v1.09.pdf>. A comprehensive Sandalwood bibliography, together with many abstracts & (often critical) Cropwatch comments, is also available at <http://www.cropwatch.org/SandalwoodbibVI.pdf>. These two resources should help empower potential sandalwood oil buyers within the aroma industry to decide for themselves just how ethical their purchasing intentions might prove to be.

The shortage of Sandalwood oil East Indian has been caused by the ravages of spike disease over many decades, and to a lesser extent by fire, vandalism, animal damage & other factors, on the existing Indian Sandalwood forests in Karnataka and Tamil Nadu, not to mention the ruthless over-exploitation of this declining resource by illegal distillers, smugglers and corrupt officials. Arguably the over-exploitation of Sandalwood only came about because of the persistent market demand for Sandalwood logs for incense, wood carving & furniture making, to continue the supply of sandalwood-based attars, and of course the demand for Sandalwood oil itself (which some have estimated at 250 tons/annum), despite warnings of serious resource depletion from eco-aware

groups. A few years back, some aromatherapy profession officials and certain aromatherapy essential oil trading representatives belittled the threat to Sandalwood (see Cropwatch bibliography), and inferred that if any blame was to be apportioned at all, it should be laid at the door of the major users, the fragrance industry. You will note that even now, within the EU, nationally-run aromatherapy vocational courses still feature Sandalwood oil for study, in spite of representations from Cropwatch to the organisers. The incense trade, of course, have ignored their obligations almost completely, and as far as we can tell, many parts of the conventional perfumery trade have done the same.

Alexandre Choueiri (2008), head of **Lancome UK**, speaking at the *Sandalwood Conference 2008, Kununurra, W. Australia*, notes that of 7,000 classified fragrances since the year 1750, 3212 contain sandalwood notes. Drawing on data from *Fragrances of the World* by Michael Edwards, Choueiri makes the point that of (only) 106 current fragrances now listing Sandalwood, only 36 detail Indian Sandalwood, and of those, only 16 detail Mysore Sandalwood. Of the 36 fragrances marketed by leading fragrance houses, Subject to correction, I counted 2 supplied by **Robertet**, 9 by **IFF**, 4 by **Drom**, 2 by **Takasago** & 3 by **Firmenich**. Of these 16 current fragrances allegedly employing Mysore Sandalwood, 4 are supplied by **IFF**, 2 by **Givaudin** (Quest), 1 by **Firmenich**, and 1 by **Symrise**. So what are we to gather from this? That the use of Sandalwood oil in fragrances is in decline, but that major aroma corporates are still ruthlessly exploiting what remains of the world's Sandalwood reserves? If they are, they are not alone in doing this. Another speaker at the conference, Venkatesha Gowda, who works for the R&D Dept. of **Karnataka Soaps & Detergents Ltd.**, a long-time manufacturer of Sandalwood soap, maintains that in spite of the official figures (14 tons/annum of Sandalwood oil exported from Tamil Nadu during 2007-8), the current (2008) annual production of Sandalwood is actually 3,000 - 4,000 tons and for Sandalwood oil it stands at 120-150 tons, of which 80 tons/annum of Sandalwood oil is consumed by the domestic market. Gowda also remarks that Sandalwood oil is adulterated by polyethylene glycols, African sandalwood oil (*Osyris lanceolata*), castor oil and coconut oil, and that he has been involved in planting *O. lanceolata* trees in India (but hopefully not with trees smuggled out of Tanzania!). Whilst not condoning the trade in Sandalwood oil at all, it seems strange to Cropwatch that more prospective buyers do not carry out a simple solubility test with 70% ethanol (if you are unaware of the details of such a test, contact Cropwatch), which is often a good indicator of the presence of added adulterants, such as fixed oils. OK, its not rocket science, but sometimes it's a useful test

Also of interest, is the fact that the **Lush** company publicly own up to using 1 ton per annum of New Caledonian Sandalwood oil (see <http://www.lush.co.uk/Shop/FeatureDetail.aspx?fdShopFeatureId=6888>) and have forwardly contracted to buy TFS Australian sandalwood (Bird 2008), as confirmed by Mark Lincoln of **Lush Australasia**, speaking at the *Kununurra Conference*. Cropwatch has reservations about the ecological effects from the abstraction of such large volumes of Sandalwood oil from New Caledonia

(bearing in mind that Lush are not the only buyers of the oil from this limited source); & none of the information presented on Cropwatch's various data-bases supports this rate of extraction (see for yourselves!). We remain open to persuasion that this policy can be truly sustainable, according to our strict interpretation of the word, but would only be too happy to review and post up any forwarded evidence to the contrary.

Of course it is well publicised that Australia has ambitions to become a major supplier of oil from *Santalum album* in the future (see the multitude of articles on this subject listed in the Cropwatch Sandalwood bibliography, mentioned above), and the *Kununurra Sandalwood Conference 2008* can primarily be seen as a conference designed by TFS mainly to re-assure investors in Australian Sandalwood plantations. Indeed, the trade magazine *Perfumer & Flavorist*, once the flagship magazine for the industry, apparently reproduced the conference organiser's promotional material without critical comment - to us, another sign of the slipping standards of this once-great magazine. Overall, Cropwatch remains skeptical of the ability of the Australian sandalwood machine to supply Sandalwood oils in the volumes estimated, of being an acceptable odour quality, & at a price that the market is prepared to pay, bearing in mind the current economic climate, the downward pressure on aroma ingredient prices, and the easy availability of very cheap synthetic sandalwood aroma chemicals.

Cropwatch is persuaded that with proper policies & investments, some Sandalwood sources can be made truly sustainable, and we believe this may well be the case in Vanuatu. However, taking pure Sandalwood oil East Indian as a benchmark, the odour profiles of Sandalwood oils from other geographical locations and/or other species are usually different in character, and lack fine notes, and may be over-sweet (as with East African Sandalwood oil) or predominantly woody-camphoraceous (as with Chinese Sandalwood oil), or just plain lacking in impact & character (as with Indonesian Sandalwood oil). From here, the future looks difficult for Sandalwood.

(All references can be located in the Sandalwood bibliography mentioned above, which is continuously revised and updated).

3. IFRA Gives Up Supporting Two More Natural Aromatics: Opoponax & Styrax Next for the Chop.

by Tony Burfield Dec 2008.

[Slightly modified from a feature first published on www.aromaconnection.org 16th Dec 2008].

For a long time, many of us have suspected, rightly or wrongly, that IFRA's underlying policy agenda is primarily to support synthetic aroma chemicals at the expense of natural aromatic ingredients. This is because synthetics have attractions over natural aromatics for the major aroma industry players, who, after all, financially support the **IFRA / RIFM / REXPAN** toxicology juggernaut. These perceived advantages include the fact that synthetic aroma chemicals are compositionally non-complex, which infers paybacks with simpler regulatory

safety compliance. They are also invariably cheaper, they can sometimes be produced in-house, & they and their applications may be patentable. Their composition is constant, and unlike natural aromatic ingredients, their price stability & constancy of supply are variables which are not so subject to the vagaries of the world's ever-changing climate.

To set the scene further, as Cropwatch have previously reported, IFRA have failed recently to properly support the continued use of citrus oils in perfumery in relation to the EU Cosmetic Commissioner's proposed draconian restrictions arising from alleged photo-carcinogenic risks from contained FCF's, and look equally likely to cave in over SCCP proposals to limit atranol & chloratranol in lichen products (oakmoss, treemoss, cedarmoss etc.). IFRA's failure to support santolina oil and melissa oil can also be added to the list. This policy of abandoning of ingredients they regard as less important, indicates that IFRA are not supporting the wider interests of the perfumery art, but merely reflecting the narrower business interests of their major sponsors. There is a vacancy to be urgently filled, therefore, for a competent safety organisation with a wider brief.

In a new departure, **IFRA's Information Letter 815** indicates that opoponax (which they claim botanically derives from 'Commiphora Erythrea var. glabrescens Engler' – we have reproduced their incorrect botanical formatting) does not have robust enough data to allow application of Quantitative Risk Assessment (QRA) methodology, and that there is a need for more 'up to date' sensitization data. IFRA claims it cannot support the required studies financially, and without these studies there is a high risk that IFRA will simply prohibit the material. Similarly for styrax (which they claim, with only slightly more botanical accuracy, is obtained from exudations of 'Liquidambar Styraciflua L. var. macrophylla or Liquidambar Orientalis Mill.'). It is not our fault, however, that IFRA have adopted a policy for sensitiser potency estimation (i.e. the QRA methodology) which it seemingly can't afford, and which both the SCCP & Cropwatch have widely criticised as being deeply flawed in practice (see *Cropwatch Newsletter* at <http://www.cropwatch.org/newslet13.pdf>).

Bear with us, whilst we revisit the botany. Mabberley (1998), Langenham (2003), Gachathi (1997) and others, describe opoponax qualities deriving not only from *Commiphora erythraea* Engl. var. *glabrescens* Engl. growing in Somalia, Kenya, E. Ethiopia, and S. Arabia, but also from other species such as *C. guidottii* (Chiov) from S. Somalia & Ethiopia, which Mabberley, the ANLAP data-base and Cropwatch regard as the primary source of opoponax. Other species used as a source of opoponax include *C. kataf* (Forssk.) Engl., *C. holtziana* Engl. spp. *holtziana* & *C. pseudopaoli* JB Gillet. Cropwatch previously briefly reviewed the chemistry of the essential oils from these *Commiphora* species at <http://www.cropwatch.org/cropwatch11.htm>. Let's also remember that the SCCP Opinion on opoponax oil (Sensitisation only) SCCP/0871/05 adopted 15th March 2005 can be found at: http://europa.eu.int/comm/health/ph_risk/committees/04_sccp/docs/sccp_o_025b.pdf. Here the SCCP committee concluded that "The provided data do indicate

that Commiphora Erythraea Glabrescens has an allergenic potential.” Cropwatch, you might remember, declared the SCCP Opinion on opoponax sensitization scientifically invalid on a number of points, not the least that the RIFM evidence cited failed to accurately identify the botanical & geographic origins of opoponax qualities used in the sensitivity protocol testing, and also failed to establish their authenticity (i.e. absence of adulteration), and dismissed the remainder of the provided evidence too flimsy to merit serious consideration. IFRA’s latest admission in its’ Information Letter 815 suggests that Cropwatch’s independent judgment of the SCCP Opinion SCCP/0871/05 was indeed correct.

Opoponax oil is a useful material that the perfumery art cannot afford to lose. Freshly dipped on a perfumer’s strip it appears sweet, oily, balsamic and almost effervescent in character, and is used in oriental accords, and to reinforce opoponax resinoids. It also finds use to freshen top notes in apple accords and to give a sweet lift to chypre fragrances. Whereas opoponax oil is primarily a top-note material, the sweeter, buttery, toffee-like and balsamic opoponax absolute is used in oriental-type fragrances as part of the sweet balsamic base notes. Under the existing IFRA Standard, opoponax extracts and distillates prepared from the gum must not exceed 0.6% concentration in product.

Styrax also is apparently to be potentially abandoned by IFRA on QRA testing-cost grounds, & is another aroma ingredient with an important place in the art of perfumery, being derived from a number of *Liquidambar* spp. including *Liquidambar styraciflua* L.; *L. orientalis* var. *orientalis*; *L. orientalis* var. *integriloba* & *L. formosana* H. Styrax oleoresin is produced either by boiling the *Liquidambar* tree bark in water, and collecting the oleoresin which collects in the bottom of the vessel, or by tapping the trees, where the resin is usually collected in cans. The former type of crude gum styrax is especially used as a fumigant (purifying incense). Styrax gum oleoresins have been banned IFRA since 1977; only extracts & distillates are permitted under the existing IFRA Standard; under this guideline the final concentration in product must not exceed 0.6%. Solvent extracted styrax resinoid has a complex odour comprising sweet, balsamic & fresh elements and possesses a great deal of lift & radiance. It has been used in perfumery as a fixative in oriental fragrances, and in chypres. It is also useful in constructing hyacinth and leather notes, and for powdery accords, with vanillin, heliotropin etc. As Cropwatch points out in its latest *Updated List of Threatened Aromatic Plants Used in the Aroma & Cosmetic Industries v1.09 Dec. 2008*, styrax qualities used to be heavily used as fragrance ingredients, but IFRA requirements to produce a skin-neutral product devoid of free cinnamic acid, have resulted in chemically treated ingredients with less useful attractive odour characteristics, and so its deployment in fragrances has plummeted. So not only has IFRA been instrumental in the decline of styrax usage in perfumery, it is now apparently performing the last rites over a fatally disabled ingredient. Although commercially available from several producing areas, the “American” type of styrax produced from *Liquidambar styraciflua* L., is mainly exported from Honduras & Guatemala, and the ‘Asian’ type styrax from *L. orientalis* Mill. from Turkey, and it is these two types effectively dominate the market, the US always

favouring the Honduras material. However with worries that the *Liquidambar orientalis* forest in the Eastern Mediterranean (i.e. the private & State owned forest centered in S.E. Anatolia in Turkey) is now greatly reduced through wood-felling and resin extraction, to the extent that Topal *et al.* 2008 say the species is facing extinction). Cropwatch can therefore no longer support the use of commodities from *Liquidambar orientalis* in perfumery.

The inevitable reduction in availability of Asian styrax as the Turkish forests disappear, will probably result in the increased extraction of other styrax sources. Just as long as they leave the styrax trees alone in the wonderful Valley of the Butterflies on the island of Rhodes,...

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4. Frankincense – A Brief Catch-Up.

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[Slightly corrected & modified from a feature first published on www.aromaconnection.org 1st Jan. 2009].

The year 2008 saw the publication of a number of papers on the analysis & therapeutic properties of Frankincense gum, extracts & distillates, and it is only in recent years perhaps, that we are gaining further insight into the true nature & therapeutic potential of these various exudations & preparations. The whitish-yellow or yellow-orange tears or lumps of Frankincense gum (syn. Olibanum) (syn. Incense) are obtained by tapping the trees of a number of *Boswellia* spp., and the gum & derivatives are valuable exported commodities for the Horn of Africa region (Djibouti, Ethiopia, Eritrea, Somalia & the island of Socotra (off Yemen)), but also for Sudan and other African regions. Frankincense gum is used to prepare incense, and extracts & distillates have been widely used as fragrance ingredients. Indian, Arabian & African *Boswellia* spp. have a number of uses in local ethnic medicine, which is starting to translate into uses in evidence-based conventional medicine (see for example, the major feature on Frankincense & derivatives in *Phytomedicine*, June 2008).

For a working definition, we can say that Frankincense is the dried exudation obtained from the schizogenous gum-oleoresin pockets in the bark of various *Boswellia* spp - the *Boswellia* group itself being placed within the *Burseraceae*

family. The *Boswellia* group constitutes some 25 species of shrubs or small trees found in the dry tropical areas of N.E. Africa, S. Arabia and India (including N.E. Tanzania and Madagascar) growing at a height of 1000 to 1800 m. :

<i>Boswellia</i> Species.	Eritrea	Ethiopia	Somalia	Sudan	India	Kenya	Oman	Nigeria
<i>Boswellia bhau-dajiana</i> Birdw.*			√					
<i>B. dalzielii</i> Hutch.								√
<i>B. frereana</i> Birdw.			√					
<i>B. microphylla</i> Chiov.		√						
<i>B. neglecta</i> S. Morre		√	√			√		
<i>B. ogadensis</i> Vollesen		√						
<i>B. papyrifera</i> (Del.) Hochst	√	√		√				
<i>B. pirottae</i> Chiov.		√						
<i>B. rivae</i> Engl.		√	√					
<i>B. sacra</i> Flück **		√	√					
<i>B. serrata</i> Roxb.					√		√	

Table 1. Distribution of some *Boswellia* spp.

*some now say syn. *B. sacra* Flück ** syn. *B. carteri* Birdw.

Frankincense – Uses.

Frankincense has been very highly valued for thousands of years, dating to pre-Roman times, and has many uses & applications. It is the Horn of Africa's highest volume export, and apart from uses in incense/perfumery, the gum oleoresin & preparations thereof are also used in a number of medicinal systems, for flavourings ('maidi' type of frankincense preferred) & for skin cosmetic applications for toner, emollient & anti-wrinkle uses.

Survival Pressure on *Boswellia* spp.

Several *Boswellia* spp. are listed in the IUCN Red List of Threatened Species 2008, including several individual spp. from the island of Socotra, off Yemen:

<i>Boswellia aff. ameero</i> Vulnerable D2	- native to Socotrana
<i>Boswellia ameero</i> Vulnerable B2ab(ii,iii)	- native to Socotrana
<i>Boswellia bullata</i> Vulnerable D2	- native to Socotrana
<i>Boswellia dioscorides</i> Vulnerable D2	- native to Socotrana
<i>Boswellia elongata</i> Vulnerable B2ab(iii)	- native to Socotrana
<i>Boswellia nana</i> Vulnerable D2	- native to Socotrana
<i>Boswellia ogadensis</i> Vulnerable D2	-only from 1 river location in Ethiopia.
<i>Boswellia pirottae</i> LR/nt	- only from 3 river locations in Ethiopia
<i>Boswellia popoviana</i> Vulnerable D2	- native to Socotrana

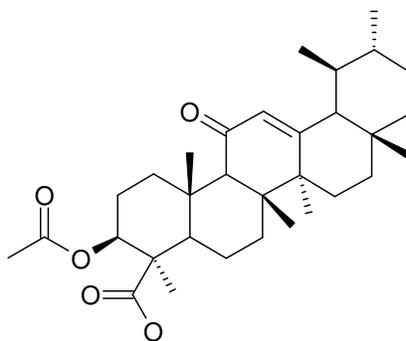
Boswellia sacra LR/nt - native to Oman, Somalia & S. Yemen.
Boswellia socotrana Vulnerable D2 - native to Socotrana

Of these, probably only *B. sacra* is of any significant commercial importance. However, the IUCN does not list other Frankincense-yielding species of commercial importance which would also appear to be under threat e.g. *Boswellia papyrifera* in Eritrea, Ethiopia & Sudan (for detail, see Cropwatch's *Updated List of Threatened Aromatic Plants Used in the Aroma & Cosmetic Industries v1.09* Dec 2008). The results of the analysis of the essential oils from three threatened *Boswellia* species of the eight endemic to Socotra, have recently been published (Awadh Ali *et al.* 2008). Curiously, the authors do not mention the threatened status of the species studied.

Frankincense - Anti-inflammatory Effects.

Given the use of Indian Frankincense (*B. serrata*) gum-oleoresin in treating inflammatory disease in Ayurvedic medicine, a number of researchers have investigated the anti-inflammatory & anti-arthritic effects of the *Boswellia* resins. Frankincense contains α - and β -boswellic acids from 3 α -hydroxy-olean-12-en-24-oic acid and 3 α -hydroxy-urs-12-en-24-oic acid respectively, amongst others. Boswellic acid & pentacyclic triterpene acids are marketed as anti-inflammatory & anti-arthritic drugs in India (Handa 1992). Examples of commercialised products containing boswellic acids include 'H15' and 'Sallaki'. Another, 'Boswellin' (a patented product of Sabinsa Corporation) is described as the standardized ethanol extract of *Boswellia serrata* gum resin, containing 60% to 65% boswellic acids.

The mechanism of the anti-inflammatory action may occur via the inhibition of 5-lipoxygenase (and hence leukotriene biosynthesis: Ammon *et al.* 1993; Ammon 1996). This action taken together with inhibition of human leukocyte elastase (Safayhi *et al.* 1997) may constitute the basis of the anti-inflammatory effect, since both of these enzymes play key roles in inflammatory & hypersensitivity-based diseases. The most active inhibitor of 5-lipoxygenase seems to be acetyl-11-keto-beta-boswellic acid, which is also cytotoxic to meningioma cultures (Park *et al.* 2000).



acetyl-11-ketoboswellic acid

The use of *Boswellia* preparations to treat another inflammatory disease, ulcerative colitis, may also owe its beneficial action to 5-lipoxygenase inhibition (Gupta *et al.* 1997).

Anti-carcinogenic Effects.

Leading on from the above, extracts of *B. serrata* & boswellic acids & their derivatives have been investigated by a number of researchers for their (chemopreventive) anti-carcinogenic/anti-tumorigenic effects via their cytotoxic & apoptosis effects in various *in vitro* cell lines. In particular acetyl-11-keto-beta-boswellic acid shows strong cytotoxic activity against meningioma cell-lines and is the strongest 5-lipoxygenase inhibitor yet tested amongst triterpenoids (Hostanska *et al.* 2002). See Cropwatch's *Frankincense Bibliography* v1.02 Jan 2009 for further details.

Use in Treating Respiratory Disease.

Gupta *et al.* (1997) investigated the use of *B. serrata* gum resin in patients with bronchial asthma in 23 males & 17 females with a history of the disease, in a double-blind, placebo-controlled, 6-week clinical study, 70% of the patients showed an improvement (against a 27% improvement in the control group).

Incense: the Purifying Smoke.

The smoke of incense is traditionally used in Arabia & N.E. Africa for its deodorizing and purifying effects. Basar (2005) showed that the pyrolysates of *Boswellia carterii* & *B. serrata* resins showed anti-bacterial inhibition for contained certain substances e.g. 24-norursa-3,12-diene, incensole acetate & cembrene A, in the case of *B. carterii*. The author concluded that the results could support the successful use of certain *Boswellia* resins as a disinfectants in traditional ceremonies.

Analysis.

The literature is beset with analytical investigations of non-botanically verified frankincense samples, often obtained from local markets. A few papers have been published more recently where reliable botanical identification has been established. One such paper is that of Hamm *et al.* (2005) who analysed the mono-, sesqui- & di-terpene contents of 6 olibanum samples of botanically certified origin. The authors found for example that the origin of local market samples could be traced by their analytical profiles: for example the characteristic chemical compounds of *Boswellia papyrifera* L. samples were stated as the diterpenic biomarkers incensole and its oxide and acetate derivatives, n-octanol and n-octyl acetate.

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5. The Art of Natural Perfumery: Under Threat from Natural & Organic Cosmetic Certifying Organisations? – by Tony Burfield.

(Some relevant text from Cropwatch's *Updated List of Threatened Plants Used in the Aroma & Cosmetic Industries* has been included here).

As an aside, it has been the author's privilege over the years to be able to travel somewhat, often visiting distilleries in fairly far-flung locations. Where these production sites were the satellite outposts of an international parent group, I was often proudly presented with a box of authentic essential oil samples by the general manager, who wanted me to see the inherent quality of the products before they were shipped back to the parent company in France, Germany (or wherever) to be 'extended'. With all this adulteration going on at source, or further down the distribution chain (and sometimes both!), the authentication of natural aromatic substances becomes imperative, yet few researchers bother, or even know how to carry out such a task. The same situation applies to many vegetable oils and botanical extracts. Up to now, natural ingredient certifying organisations have been shown to be inadequate in their ability to police ingredient authenticity, and have been duped by the perpetrators of these practices, along with everybody else.

Returning to the main subject, as discussed above, the failure of national authorities to regulate over the expanding natural & organic cosmetic products market (worth an estimated €1.4 billion in Europe alone) has led to the rise of groups of self-appointed individuals with interests in making easy money, springing up in the role of certifying organisations. It's hard for casual observers to keep up with who is suing who, which organisation is joining which group, and

which is defecting to another. In 2008 we heard about OASIS, co-founded by Karl Halpert of Private Label Select, said to be supported by the heavyweights: l'Oreal, Estée Lauder, Cognis & Aveda (amongst others) who were quoted as working towards two Organic Production Standards for 2010. Other US-based groups include the Natural products Association (NPA) & NSF (see below). In the EU, there is the European Natural & Organic Cosmetics Interest Grouping (ENOCIG) who have joined up with IKW (actually the German Cosmetic, Toiletry, Perfumery and Detergent Association) to form the NaTrue certifying group, who still seem to be influential headline-grabbing contenders in 2009. Other organic certifying organisations include the not-for-profits organisation NSF International, Simples (France), Demeter (Germany), Suolo e Salute (Italy), Agrobio (Portugal), Vida Sana (Spain), CRAE (Spain) & Biotop (Israel). In late 2008, under COSMOS, a group consisting of Bioforum, Cosmebio, Ecocert, BDIH, ICEA and the Soil Association, drafted a document for public consultation on Natural & Organic Cosmetic Standards which they hope to have realised by the end of 2009. You can follow this at http://www.oasisseal.org/organic_production_standard.htm where, at the time of going to press, the latest 100# standard is displayed, together with a list of approved synthetic ingredients which bow to the demands of Western corporate cosmetics technology. It is quite conceivable that some cosmetic products (nail varnish; hair conditioners etc.) will never be manufactured in a truly organic manner.

Existing Definitions for Natural/Organic:

To recap, natural aromatic ingredients are already adequately defined in food/flavorings legislation, but either these definitions are either largely unknown or misunderstood by the market, or they seem inadequate for today's natural personal care sector:

US: 21st Code of Federal Regulation (CFR) 101.22(a)3 – defines natural flavor or natural flavoring and includes the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional. It assumes natural flavourings as 100% derived from named source.

EEC: Regulation 88/388/EEC (22.6.88) article 1, §2 (b) (i) – natural aromatic substance to be 90% + derived from named source, or refer to article 1, §2 (c) – natural aromatic preparation. Organic certification in the EU is regulated by Council Regulation 2092/91 EEC Rules of production from plants & plant products is set out under art 6 annex 1, rules for inspection requirements from farms or collection (annex !!!, A)

United States Dept. of Agriculture (USDA) National Organic Program (NOP) 7 CFR 205 regulates organic status for US agricultural products in the US; organic certification, requiring an audit trail tracking all handlers from farm to distributor and requires materials to originate from an organism with a genome unaltered by modern biotechnology, and to be produced/processed without synthetic pesticides, synthetic fertilisers, irradiation etc.

and/or cosmetic/fragrance ingredient legislation, as defined under:

ISO 9325 Article 9 Sect 2. The criteria for Natural Cosmetics under guidelines proposed by the Committee of Experts on Cosmetic Products 2000. However these guidelines are not backed by specific legislation, and have no weight in law.

Natural Products Association (NPA) Guidelines.

These can be viewed at www.naturalproductsassoc.org/certifiednatural. Cropwatch wrote to Daniel Fabricant (and copied the board) at the NPA, writing from a natural perfumers perspective about their guidelines for natural care products as released on Oct 18th 2008 (no reply received). At the time we made the following comments (in green) to their proposals (in black), our comments subsequently have been edited here somewhat for clarity purposes:

NPA: “Product must be made up of at least 95 percent truly natural ingredients or ingredients that are derived from natural sources” – Cropwatch believes that both end-products and natural ingredient are either 100% natural, or that they are non-natural, period. 100% natural perfumes are already here, and are an easily attainable industry standard, but they` are expensive and often have problems with regulatory adherence.

NPA: “No processes (permitted) that significantly or adversely alter the purity/effect of the natural ingredients” – this would eliminate all aromatic raw material ingredients that are artifacts, such as oakmoss, treemoss, cedarmoss etc., who’s fragrant principles develop via chemical reaction with alcohol. It would also arguably eliminate all ethanolic extracts, tinctures etc. as well, let alone alcoholic perfumes themselves, where only a degree of chemical interaction takes place, but that which does occur, markedly affects the odour profile and acceptability of the product, as any trainee perfumer learns at an early stage. The NPA could join Cropwatch’s forthcoming Natural Perfumery courses to fully comprehend the chemistry involved....we wager they would then amend this proposal.

NPA: “Ingredients that come from a purposeful, renewable/plentiful source found in nature (flora, fauna, mineral)”. **Fauna??** This will potentially offend many consumers - animal products for cosmetic/perfumery use are almost universally considered as unethical, with an almost zero reported usage amongst the major international groups (except, perhaps for L’Oréal’s use of squalane from sharks). This aside, please note the word ‘sustainable’ is carefully avoided, with the weasel words ‘renewable/plentiful’ inserted instead. Several once renewable/plentiful commodities are now extremely rare through recent over-exploitation, in spite of previous supplier reassurances – see Cropwatch files. We recommend NPA works with the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP) – see under BDIH below,

NPA: “Processes that are minimal and don’t use synthetic/harsh chemicals or otherwise dilute purity” This would eliminate whole classes of aromatic raw materials – resinoids, absolutes, solvent extracts etc. and, turn back the clock 170 years. The first successful solvent extraction of flowers with solvents arguably took place in 1835, and by 1890 companies like Charabot, Chiris, Piver, Roure, Vincent & Nandon were making pretty reasonable concretes & absolutes. The further point is, to tailor perfumes to cost, diluents are quite necessarily added. Overall this stipulation makes a mockery of the heritage & art of conventional perfumery, and the growing art of natural perfumery.

NPA“Non-natural ingredients only when viable natural alternative ingredients are unavailable and only when there are absolutely no suspected potential human health risks.” This is a nonsense – few, if any, cosmetic ingredients are absolutely without potential health risks to humans, and we defy the NPA to come up with sufficient to make a natural cosmetic - certainly the majority of aroma ingredients have associated risk phrases. But more importantly, the NPA gives free license here for non-naturals to be incorporated into so-called natural products (as do others, see below).

We could go on – for example, the NPA’s faith in the GRAS classification system for chemicals is touching, but naive – the reality is that many of these approved chemicals were nodded through by committees of industrialists rather than being rigorously safety tested. In any case many ingredients granted GRAS status were in the context of a flavourings usage at 10-40 ppm.

The Natural Ingredient Resources Centre (NIRC) Guidelines

Gives us a brief stumble through natural ingredient definitions according to various authorities at <http://www.naturalingredient.org/naturalingredients.htm> and offers a guidance-definition of its own. Cropwatch would go along with much of this content, apart from the aversion to non-natural solvents, since precluding these would eliminate a whole range of natural ingredients and limit the art of the possible in natural perfumery, as discussed above under the NPA guidelines.

The BDIH Guidelines.

1. Weasel words are used over threatened species. Phrases like ‘as far as possible’ and ‘controlled biological wild collections’ fall well short of actually banning threatened & rare species from formulations. Cropwatch recommends that the BDIH look at the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP), now under the auspices of the FairWild Foundation, as of October 2008, to see if this standard is not more appropriate for its guidelines as regarding wild collection. Organisation officials should also take responsibility to see that their activities in certifying natural cosmetics and their ingredients does not lead to further over-exploitation of an already tight market supply situation for many plant-derived commodities.

2. Similarly, *all* animal products are not banned outright in these guidelines, just those from dead vertebrates. Bear bile, civet, castoreum, ambergris, and a host of other unacceptable & unethical animal products are thereby theoretically allowed.

3. Natural substrates (fats, oils, waxes, lanolin etc) can apparently be subjected to various synthetic chemical processes (hydrolysis, hydrogenation, esterification, transesterification etc.) to produce allowable ingredients for natural cosmetics. However these reaction products are, of course, synthetic by definition, unless the technology is based on purely physical or enzymic/fermentative technology. So, we conclude that the technology for the production of 100% natural & organic chemicals for cosmetics is, of course, simply just not there.

The COSMOS Cosmetics Organic & Natural Standard Consultative Draft 3rd Nov 2008.

As noted above this standard was contrived by ICEA (Italy), BDIH (Germany), Bioforum (Belgium), Cosmebio/Ecocert (France) & Soil Association (UK), and the standard come into force on 30th March 2009. Briefly, all products must have a 5% synthetics content maximum. Organic Production Standards are 20% organic now, rising to 50% by 2020; 95% of the physically processed agro-organic

products must be organically produced; and 2 years after the standard is introduced, 30% of the chemically processed agro-organic ingredients must be organic, rising to 50% by 2015. A feature on OASIS in the trade press (Anon 2008a) reveals that (presumably synthetic) fragrances must be produced by 'The 12 Principles of Green Chemistry' – referring to Anastas & Warner (1998). These can be briefly listed as:

Prevent waste	Define safer chemicals/products
Design less hazardous chemical syntheses	Use reworkable feedstocks
Avoid chemical derivatives	Use catalysts not stoichiometric reagents
Avoid chemical derivatives	Maximise atom economy
Use safer solvents & reaction conditions	Increase energy efficiency
Design chemicals & products to degrade after use	Analyse in real time to prevent pollution
Minimise accident potential.	

But is there anything really new here? Most companies already work in a competitive situation and abide by many or most of the above principles, in order to maintain costs at the lowest possible levels. Most responsible companies will also have an environmental policy covering the remainder of the points – in many nations, this will anyway be required by law. In summary, these principles seem to be common sense conveniently promoted as industrial virtuosity.

The article mentioned above (Anon 2008a) quotes another OASIS founder, Tim Kapsner, over the difficulties of producing wholly organic fragrances: “,, you need to allow some processing to occur to make plant materials into cosmetic ingredients. Some of that processing would be in the context of this model of green chemistry to create aroma materials.” As far as this (natural aromatics) industry is concerned, since the earlier COSMOS 'Organic and Sustainable Industry Standards, Inc. Health and Beauty Products Beta Version #3 – March 11, 2008' failed to define 'essential oils' according to the accepted ISO standard, maybe things do not auger too well just at the moment. Neither do we gain much comfort from the reported activities of companies like Laboratory Monique Remy (LMR). In an article (Anon 2008b) which describes their commendable efforts to grow iris, rose & blackcurrant crops pesticide-free & refers to the 'green chemistry' buzz-phrase, the account then goes on to describe LMR's work in developing alternative extraction techniques to the use of hexane. Apparently LMR claim to use a hydrofluorinated solvent – [Aaaargh!!] instead of hexane to extract a marketed blackcurrant product; Cropwatch regards this as a step in the wrong direction – the build up of fluorinated compounds in the environment is a considerably worse prospect, surely, than using hexane in the first place?

References:

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- Anon (2008b) "Editing nature." *Perf & Flav.* **33** (June 2008), 38-39

OASIS Organic & Sustainable Industry Standards 100# edited 03/12/2008

A very wordy & bureaucratic document which, nonetheless, under 6.1.3.4, allows the following synthetic processes for to produce chemicals for use in health & beauty products:

Hydrolysis	Hydrogenation
Hydrogenolysis	Esterification
Transesterification	Etherification
Saponification	Sulfation
Protein Acylation	Glucosidation
Neutralization	

Its difficult not to burst into fits of laughing - particularly controversial on the Allowed Materials list of 170 (yes 170!) allowed non-organics, are the listed allowed inorganic catalysts, some of which are carcinogenic, potentially polluting and unless reclaimed, deplete the earth's stock of rare metals. Proclamations like this may please the heavy chemical industry, but make a complete mockery of their case to disallow relatively far safer petrochemicals such as hexane. The list of 'physically processed agro-ingredients makes various stipulations on the use of animal products but does not exclude *all* animal-derived commodities. The group makes the familiar mistake of excluding threatened species on the European, Washington & Berne Convention lists, but surely we all know by now that these lists are subject to different interpretation by government departments across the globe, and are so behind events that intractable over-exploitative situations are liable to have occurred before any specific listing occurs. It would have been more realistic perhaps to cite the Cropwatch's *Updated List of Threatened Plants Used in the Aroma & Cosmetic Industries*, which uses additionally uses IUCN Red List information on Threatened Species, with the IUCN's express permission.

Closing Remarks.

We could review proposals from other organisations, but we think you get the idea both natural & organic cosmetics are a long way from living up to the promise of their descriptions. The lack of common sense is also worrying – for example, banning added synthetics such as UV filters (one thing that Cropwatch would allow) which as well as increasing the shelf-life of the product, arguably help protect against the risk of solar/UV-induced skin cancer. This ban, taken with other considerations, means that evolving versions of natural & organic cosmetics may be in danger of becoming considerably less safe than conventional cosmetics

Regarding natural fragrances, it can be guessed that many of us who have been involved in the teaching, promotion & development of the art of Natural Perfumery over the past several years may be getting a bit hot under the collar when whole classes of raw natural aromatic ingredients are suddenly declared "not natural" by the self-proclaimed officials of certifying organisations, who don't appear have experience across all the areas they are proposing to regulate. The exclusion of concretes, absolutes & resinoids from an inventory of natural aromatics for fragrances intended for natural cosmetics may well pander to the more chemophobic amongst cosmetics customers. But the banning of

petrochemical solvents cannot be justified on health grounds relating to supposedly harmful amounts of solvent residues that remain in these materials – since there is no health risk. We should also mention that there is a move to allow solvent extraction in the form of allowing CO₂ extracts and bio-ethanol. The protagonists of these proposals do not make clear how they are going to determine whether the CO₂ used in such processes is natural (i.e. produced by fermentation of natural materials etc.), or how they will propose to police the matter. Cropwatch's guess is that (a) they haven't thought about it and (b) they can't guarantee it (thanks to Daniel Joulain for bringing this to our attention). The proposed allowable use of bio-ethanol is welcome, but does not substitute for the elimination of other solvents.

We can clearly see that attempts by these certifying organisations to redefine natural cosmetics, and natural cosmetic/aromatic ingredients clearly bow to the business interests of the major international cosmetic companies and their customers, who are the potential cash-cows that these organisations are trying to milk. The multinational's interests in the natural personal care sector has been plain enough for all to see – L'Oréal bought out The Body Shop, Estée Lauder did the same with Aveda & Clarins took over Kibio, just to mention three. That doesn't mean to say that those of us working with natural products now have to dance to a tune played by the big corporates, or the organisations that suck up to them. We feel that many of the above-cited proposals & guidelines will be rejected by those purists who have been involved with natural perfumery to its present point. You probably do not need Cropwatch to tell you that many experienced older perfumers have been found surplus to requirements lately by some of the Aroma Giants, probably because they are too expensive compared with younger perfumers. Many of these more experienced professionals are now working independently, making a living by creating natural perfumes. It is unlikely, we feel, that this group will accept many of the definitions currently proposed by these Natural & Organic Cosmetic Certifying Organisations, and hopefully this group will become a growing influence in this area, for better values, independent of big industry's requirements.

6. The Oakmoss & Treemoss Saga – Slight Return.

D. Joulain & R. Tabacchi, two people who, perhaps more than any others, have been responsible for unraveling the chemistry of oakmoss & treemoss products over their working lives, have written a review of oakmoss planned to be published in *Flavour and Fragrance Journal* by mid-February 2009. This will be followed by a review on treemoss products by the same authors in the following edition. A third article reviewing the biological properties of lichen products by different authorship is planned for the following edition of the journal. We will be interested to see whether those members of the SCCP with a lesser knowledge & no industrial experience of these lichen products will be embarrassed by the content & conclusions of these articles. You will remember that the SCCP cobbled together an over-hasty SCCP Opinion on limits for the potent sensitiser atranol & chloroatranol, which was previously reviewed in the September 2008 edition of *Cropwatch Newsletter*.

7. GM Fragrance Anyone? – Hopefully No Takers.

In October 2008, an article appeared in a free trade magazine referring to the possibility of commercial GM fragrances from flowers & yeast (Bird 2008). To attempt to put this subject area more into context, we have to consider that within the European food & feed flavourings industry, there are a number of regulatory measures in place to ensure that flavourings & flavouring ingredients have not been manufactured via the use of Genetically Modified Organisms (GMO's) or derivatives, and that the product itself or any ingredient thereof, does not contain any GMO's. These measures reflect the concerns of European consumers towards GM technology. Further, there are stipulations that no enzymes derived from GMO's have been used in the manufacturing process for any flavouring/flavouring ingredient. Bear with me for the rest of the paragraph - this is embodied in GM-Free Certification concerning EEC Regulation 2092/91/EGW Biological Agriculture and concerning Food regulations in line with EC Directives 1829/2003 & 1830/2003 concerning the traceability and labelling of food/free products from GMO's (amending Directive 2001/18/EC). Ingredients intended for fragrances are often treated via the same set of regulatory guidelines, since many bought-in aromatic ingredients could also be used for a flavouring or fragrance purpose (although they may have to be stored and compounded in separate areas).

Strange then, given this aversion to GM-products within the European aroma trade, that GM scientists should still have their eyes on the potential for transgenic aromatic plants. Cropwatch has been following the developments in this field for some time: to recap, we had believed that a cell of GM plant scientists from Oxford, UK, dispersed to Australia, New Zealand and China several years ago. China has shown some previous interest in experimenting with GM Eucalyptus & Larch trees, as has New Zealand, as Cropwatch has previously reported. But we had thought that the trail had largely gone cold, apart from some interest in snapdragon plants (*Antirrhinum majus*), which has been rumbling on for a number of years. We were wrong. Developments were proceeding largely via the floriculture industry.

One of the reasons that the floriculture industry might (misguidedly, we think) feel that it would benefit from the attentions of GM bioscience technology, is to restore scent to its highly bred cultivars – as we know only too well, the floriculture industry has been too taken with producing showy, well defined and colourful plants with, extended blooming periods, and the fragrance character of the flowers in many cases` has been all but lost. Clark reviewed consumer preferences for fresh cut flowers, mentioning the potential role of engineering floriculture crops that appeal to human olfactory senses (Clark 2007). Pompelli *et al.* (2007) reviewed the possible role of biotechnology for Brazil's floriculture industry. Yet the ambitions for this technology have still outstripped its achievable performance to date. Early work carried out on petunias and carnations involved the gene that expressed the linalool synthase gene from *C. breweri*, although this

resulted in little linalool being produced and did not target a specific site in the plant Dudareva, *et al* (1996).

But technology gathered pace. The intentional release of GM flowering plants into the environment during trials by the floriculture industry came to our attention. Florigene Pty Ltd ('[Florigene](#)') applied in March 2006 to release 3 Japanese-bred GM rose lines over two years (March 2006 to April 2008) into the Australian environment in the Shire of Yarra Ranges, Victoria. The hybrid plants had been genetically modified by the insertion of genes that affect the production of blue coloured anthocyanin pigments (i.e. delphinidins), and there is a link between pigment & scent production. The risk assessment carried out by the Office of the Gene Technology Regulator of the Australian Govt. can still be viewed by clicking on the html option in Google of the withdrawn page for the original, at <http://www.ogtr.gov.au/rtf/ir/dir060finalrarmp.rtf>. Please contact Cropwatch if you difficulty in reviving the ghost of this page.

Bird (2008) writing in *CosmeticDesign-Europe* drew our attention to work at the Hebrew University, Jerusalem allegedly referring to GM flowers that produce 10 times the scent of the wild-type, and discussing the potential of introducing aroma related genes into yeast genomes to produce harvestable aroma ingredients after work-up. The report referred to an article in *Plant Biotechnology Journal* focussing on petunias where the Pap1 transcription factor (involved in the production of anthocyanin pigment 1) from another flowering plant (*Arabidopsis thaliana*) was introduced into the petunia, to increase the production of aroma compounds. As the petunia is normally unscented or night-scented, the team found that feeding phenylalanine to the transgenic plants produced (additional) day-time scent emission.

Although Bird offers no ethical opinion, it is anyway quite difficult to speculate on the public acceptability of any future direction for transgenic plants, although the article states that the team leader, Alexander Vanstein is in talks with players in the fragrance industry. Cropwatch would be interested to understand who these players might be. Although other reports of Vanstein's genetic work appears on the internet – for example at http://greenbio.checkbiotech.org/news/genetically_enhancing_scent_flowers, an article on the Agrifood Awareness, Australia website at http://www.afa.com.au/news/n_news-2017.asp gives more details of Vanstein's projects in greenhouses located at the Hebrew University's *Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture* in Rehovot. Amongst talk of designer flowers “to match to match the color of one's clothes, eyes or furniture, for example, or with a specific smell”, the feature also reveals that the players mentioned above are located in Israel, the UK and the US - a clue here, surely - and that commercial trials have been carried out, the work is unpublished, but that contracts “are likely in the future.” How much of this is talking-up the subject and how they will attempt to overcome the inherent public resistance to GM technology, remains to be seen. Even the revealed proposals

of many of the Naturals & Organic Certifying Organisations for Natural Cosmetics (to their credit) disallow GM ingredients....

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Additional Reading

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Lücker J., Schwab W., van Hautum B., Blaas J., van der Plas L.H.W., Bouwmeester H.J., & Verhoeven H.A. (2004) "Increased and altered fragrance of tobacco plants after metabolic engineering using three monoterpene synthases from lemon." *Plant Physiol* **134**, 510-519

Mahmoud S.S. & Croteau R (2002) "Strategies for transgenic manipulation of monoterpene biosynthesis in plants." *TIPS* **7**, 366-373.

8. IFRA Workshop - Allergy Prevalence in Fragrance, November 4, 2008, Brussels, Belgium.

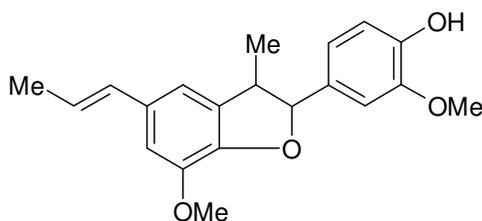
Highlights of this corporate-funded (?) event included a lecture by Axel Schnuch (Univ. of Göttingen) who reported that sensitization to fragrance ingredients has decreased considerably over the years, and for some weak allergens, the rate of incidence is now so low that several thousands of subjects now need to be tested to obtain one genuinely positive result. If it is true that the proportionate population-weighted response to allergens is declining, it is an extremely convenient finding, as it presumably exonerates, the findings of previous dermatological researchers. In fact, at Cropwatch, we can't think of a better way to get them off the hook. On the other hand, if it is not true, and, say, the response was always this low for pure samples of weak sensitizers, it begs

serious questions; not the least the enormous cost to industry for no particular achieved purpose. Schnuch reiterated his previous contentions “There are obviously fragrance ingredients among the 26 which are, with regard to contact allergy, of great, others of minor, and some of no importance at all.” However this seemed to cut no ice in terms of regulatory reform with Annette Orloff, of DG Enterprise, who mentioned the 2004 labelling legislation connected to the notorious 26 allergens situation, which, as Cropwatch previously reported, toxicologists have been lining up to criticise in professional journals. Perhaps Orloff doesn’t read these, as she was also reported (Weller 2008), somewhat disturbingly we feel, as outlining her happiness to work with the trade-sponsored IFRA organisation, and mentioned the 2008 revision of the Cosmetic Directive where 74 of IFRA-restricted ingredients have been imported into Annex III. There is obviously a need for an independent body to review the gross over-regulation of the European cosmetics industry *per se*. This, we feel, is partially as a result of the over-cosy relationship that IFRA enjoys, spoon-feeding the Cosmetics Commission committees with appropriate data (not all of which is ever publicly disclosed – see previous Cropwatch files) to plug-in to their policy framework. This situation was never more apparent than at present, according to many of the attending conference delegates that we have spoken to.

Reference: Weller S. (2008) “Special Report: IFRA Workshop - Allergy Prevalence in Fragrance, November 4, 2008, Brussels, Belgium.” *P&FNow* Nov 26th 2008.

9. More on Ylang-ylang oil.

Daniel Joulain pulled Cropwatch up on a roundabout claim that we made in the last *Cropwatch Newsletter* (Sept 2008) to the effect that the elimination of coniferyl benzoate was connected with a process for the production of hypoallergenic ylang ylang oil. Joulain points out that coniferyl benzoate is not a known constituent of authentic ylang ylang oil, but that it is rather a component of jasmine grandiflorum absolute qualities. Joulain further points out that Watanabe *et al.* (1985) previously identified dehydrodiisoeugenol as a potent sensitiser in ylang ylang oil.



dehydrodiisoeugenol

However what I had partially remembered, was probably a patent which Joulain identified as being taken out by Takasago and Shiseido in the 1980’s, to remove coniferyl benzoate from both jasmine & ylang ylang qualities. Joulain hypothesises that the presence of coniferyl benzoate may arise from the practice of adding Benzoin Sumatra tears (with a high coniferyl benzoate content) as an adulterant to Egyptian & Indian jasmine concretes, for an anti-oxidant effect and to impart a brilliance to the product. Similarities with jasmine processing at

Grasse were alluded to by Joulain, since Sumatra benzoin was used as an additive in the "corps préparé" (pig lard and beef suet) for the enfleurage processing of jasmine in Grasse, as noted by Naves/Mazuyer (Reinhold Pub. Co., 1947). As a final note, Joulain confides that he has detected coniferyl ethyl ether in traces from jasmine flowers which doesn't eliminate his hypothesis above. Thanks to Daniel Joulain for sharing his scholarship and intimate knowledge of these materials with us.

Up to now, detailed information on ylang ylang commodities has been difficult to obtain. The author previously reviewed the boxed & outsized 16-page book *L'Ylang ylang: Un Parfum Subtil* by Christian Brulé & William Pécout pub. by V.F. Aromatique et Arco-Charabot (undated, believed to be pub. around 1994) which is probably a collector's item by now. I had the privilege of meeting Christian Brulé in Paris in 1994, and he was kind enough to duplicate some slides for me from his collection, for a presentation I was giving on essential oils to the *British Society of Perfumers* (subsequently written up by Liz Jones in *SPC* 1/6/1994). His intimate knowledge of distillation in Madagascar & the Comores, I distinctly remember, and surpassed anything I had previously encountered.

Returning to the present, I haven't seen what I would consider an authentic sample of ylang ylang oil from a named geographic source for years (this is a pity: I appreciate the odour qualities of pure 'ylang oils particularly from Mayotte). All samples I seem to encounter are (so obviously) adulterated. A feature by Pierre-Jean Hellivan of Charabot (Hellivan 2008) might go some way to explaining why. Hellivan describes a process where 3 Comoros ylang ylang traders went out of business in the recent past, and in the resulting market mayhem caused by opportunist traders, a rumour went around the Comoros Islands that heating ylang ylang III increases the density to resemble that of ylang ylang extra, thus making a large profit, well, on paper, anyway. Hellivan goes on to describe how this adulteration took hold in the area, to the extent that the reputation of the industry is potentially shot, there is a shortage of ylang ylang III, and good quality Ylang ylang extra is in short supply. Although this isn't exactly the sort of adulteration I had in mind, let's go on with the story! Hellivan goes on to relate how Yannick Lannu, Charabot's technical & sourcing manager is acting to help re-establish standards within the network of collectors & traders in Anjouan, and who then proceeds on to Grand Comore. Mention is also made of Laure Jacquet of Charabot, who works to blend pure lots from the six different origins (Anjouan, Grand Comore, Mohela, Mayotte, Nosy-bé & Ambanja) to a consistent quality and works at formulating natural & commercial grades. Ah! It must be these I keep smelling! Just kidding.

References:

Hellivan J.-P. (2008) "Natural Stories: Ylang-ylang." *Perf & Flav.* **33** (Dec 2008), 47-51.

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