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

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### **‘Sandalwood is being smuggled out of existence’.**

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**[Archived article, reproduced for historical perspective purposes. For more recent developments, see other Cropwatch Sandalwood articles, or look up *Santalum* section in Cropwatch’s *Threatened Aromatic Species A-Z list*.]**

#### **Pre-amble.**

With the above quote from the Earth Report (2000) in mind its not surprising that the combination of excessive demand and shortage of supply for East Indian Sandalwood oil from *Santalum album* has lead to the prices rising to around \$700-750/Kg in recent months. Worries about the present sustainability of Sandalwood supplies, lead to a clampdown on Sandalwood harvesting and distillation by the Indian authorities in 1995, so that by now much or most of the E.I. Sandalwood oil coming on to the market is smuggled. The international essential oil trade itself tends to be tight-lipped about its precise sources of the oil. Anon (2002) reports that mobile squads of Forest Department officials in Chitradurga and Shimoga districts to curb sandalwood smuggling from the 30 or so private sandalwood-based factories in Andarha Pradesh close to the Karnataka border. Our information is that advance warning of impending visits of officials is causing a few quality control problems amongst producers - since impending visits of officials cause a panicked acceleration of the distillation process in order to quickly finish the task and “spirit away” the end-product. This over-hasty production, in turn, often results in Sandalwood oils that fail the ISO 3518 tests - for example with respect to solubility of the oil in 70% ethanol at 20°C.

#### **Uses.**

Sandalwood has long been prized for carving and for tourist souvenirs; it is used as an ingredient of joss-stick manufacture (especially in China & Japan) in the form of powder, wooden spills etc. Export of Sandalwood logs is theoretically prohibited from India, and so the export of lower oil-yielding Sandalwood logs from Australia (*S. spicatum*) has taken over much of this market.

Sandalwood oil E.I. is used for its creamy, precious fine wood notes and blending properties in perfumery and cosmetics, and in aromatherapy for its anti-depressant, sedative & carminative effects, useful in alleviating stress and

nervous tension (Sheppard-Hanger 1995). Other Sandalwood oils, where available, often do not possess the smooth creaminess and present a more woody and occasionally a somewhat urinic odour, character compared with the East Indian sourced oil. In spite of the worries about sustainability and smuggling, the essential oil of *S. album* is still, for example, stipulated as an obligatory oil to study for Aromatherapy National Occupational Standards in the UK (see [http://www.skillsforhealth.org.uk/standards\\_database/index.htm](http://www.skillsforhealth.org.uk/standards_database/index.htm) and click on Aromatherapy and then AY2) – the author has asked the NOS to reconsider this listing.

### **Distillation.**

Many customers do not realise that production of E.I. Sandalwood oil involves several stages. The first distillation of pulverised wood or milled Sandalwood sawdust is soaked 48 hours and distilled 2-3 days oil if carried out at a pressure of 30-40 psig, to produce the crude oil. The first 2-5% of “sandalwood terpenes” are rejected, as it contains compounds like N-furfuryl pyrrole. This compound in extremely low concentrations smells like wheat popcorn, but in higher concentrations detracts from the sandalwood odour. The terpenes fraction also contains sesquiterpene hydrocarbons such as the  $\alpha$ - and  $\beta$ -santalenes, which detract from the solubility of the oil in alcohol. The oil is then redistilled at 30-40 psig, again, often rejecting the first few fractions. Finally the resulting oil is rectified.

The relatively high energy input to produce a unit amount of Sandalwood product in the above process is ecologically unfortunate. Assessments of ecological impact for non-timber commodity production from forestry areas have to take energy efficiency into account (Burfield 2004), and the perfume designer Andrew Kobus (2003), argues that processes which involve the transport of fuel over long distances, for example, are not ideologically “organic” i.e. an essential oil produced in this manner should not be permitted to be classified as organic by the relevant certifying bodies. In any case, the necessity for vastly extended distillation times are often the result of poorly engineered process equipment. Further, at first glance it seems madness to use expensive carbon-based fuels or even wood/plant waste to produce process heat - as these contribute to atmospheric carbon dioxide loading - when a clean technology like solar power could so easily be harnessed instead. We are told that the reason that this solution is not enacted immediately is, of course, one of lack of capital, but this must be balanced against the costs involved in the continual buying of fuel and the unaccounted and unseen costs of environmental damage.

### **Blending; other Sandalwood species.**

The aroma industry is presently so desperate for half-decent Sandalwood oil qualities, that it frequently and unknowingly accepts blends of other Sandalwood oils in with the East Indian oil. Fractions of *S. spicatum* (West Australian Sandalwood oil) or *S. austrocaledonicum* (New Caledonian Sandalwood oil) can frequently be employed for this task. The latter is often preferred by traders

because the GC-MS trace of the essential oil of *S. austrocaledonicum* is quite similar to the trace for the oil of *Santalum album*.

The Pacific island group of Vanuatu has long been known as a source of Sandalwood, after the Irish explorer Peter Dillon discovered the island of Erromango was covered in sandalwood trees, but few mature trees now remain (see <http://www.vanuatutourism.com/history2.htm>). Vanuatu presently provides smaller quantities (believed to be 0.5 ton/annum) of *S. austrocaledonicum* crude oil for redistillation in Europe, and paper on the development of a strategy for the conservation of Sandalwood on Vanuatu has been made available by Chanel S. & Thompson L. (undated) at <http://www.fao.org/forestry/FOR/FORM/FOGENRES/genresbu/web27-en/sand-e.stm>. Additionally, Papua New Guinea is believed to also possess large resources of Sandalwood trees (*S. macgregorii*); *S. insulare* trees in French Polynesia have also been investigated as a source of Sandalwood oil supply. Cropwatch understands from insider sources, that immature trees of *S. album* in Australia, however, may not now be harvested for a further fifty years. Meanwhile in the past few years Indonesian Sandalwood oil from *Santalum album* has become increasingly rare, and a telling paragraph on the powerful forces controlling production in East Timor can be found at [http://www.itk.ntnu.no/ansatte/Andresen\\_Trond/kk-f/fra110699/0300.html](http://www.itk.ntnu.no/ansatte/Andresen_Trond/kk-f/fra110699/0300.html)

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