Every time I use sandalwood oil I think back to a blending workshop that I attended in England in 1994. I was trying to dispense a few drops of sandalwood oil from a bottle with a dripulator. Sandalwood oil is a very viscous liquid and it resisted leaving the bottle. The lecturer noticed how this was testing my patience and gently reminded me to enjoy the moment as dispensing sandalwood oil is such a wonderful meditative experience.

I always refer to essential oils as nature’s gift to humankind. I consider sandalwood oil one of the most sacred and precious gifts from nature!

Most essential oil crops can be harvested year after year without having to destroy the plant. Therefore, you can consider them sustainable crops. However, it saddens me to think that we have to physically uproot and destroy the sandalwood tree in order to obtain the wood to produce the essential oil. Even more concerning is the fact that the tree needs to be 25 years old or more. You see, the best oil is found in the heartwood and roots of the tree and the heartwood does not start to develop until the tree is about 15 years old.

If you use sandalwood oil, it is imperative that you source it from sustainable suppliers and please use it thoughtfully. All around the world there are strict laws in place to ensure that sandalwood remains sustainable. In this monograph I will talk extensively about the strategies that have been taken to ensure our grandchildren will also enjoy nature’s most precious gift to humanity.

Excessive harvesting without a strategy for replanting has substantially reduced the availability of sandalwood in India. This has resulted in global shortages and soaring market prices. Unfortunately, illegal poaching and spike disease have further contributed to the demise of sandalwood trees in India. As a result, in 2012, it was listed on the IUCN (International Union for Conservation of Nature) Red List of threatened species in India.

The monopolistic control of sandalwood trees by the Indian government has not deterred the illegal and indiscriminate harvesting of sandalwood, nor has it helped to conserve the species in its natural habitat. Paradoxically, the restrictive policies of the Indian government has discouraged legitimate interest in growing sandalwood trees. Under the existing rules, the landholder is responsible for the preservation of the sandalwood trees, which remain the exclusive property of the government, however very little incentive is provided to the landowner to protect the sandalwood trees.

Australian Sandalwoods

Australia is home to several native species of Sandalwood. The two Australian native species of commercial interest are S.spicatum and S.lanceolatum. The world’s largest sandalwood plantation of Santalum

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album has been established in the Kimberley region in Western Australia. **Santalum album** plantations in Australia began back in 1999 and we are now just starting to see Australian S.album essential oil appear on the market. The first season’s production was snatched up by the international perfume trade at an extremely high price - almost twice that of rose! Perfect Potion has managed to secure a small quantity of this precious oil.

**Santalum spicatum**

A Western Australian government report – WA Sandalwood industry development plan 2008–2020, outlines the initiatives taken to ensure Australia will become a major stakeholder in global production of S.album and S.spicatum oils. The report indicates that by 2020 there will be over 50,000 hectares of plantation sandalwood. Western Australian S.spicatum has been an important export industry since the 1840s. In the early days harvesting was unregulated and the bulk of the wood was exported to China. However in 1923, fears of over harvesting lead the Western Australian government to introduce regulations to protect commercial interests of sandalwood harvesters, conserve natural stands and ensure that the Crown collected sandalwood royalty. To ensure that S.spicatum is managed sustainably, harvesting is strictly controlled through the issue of a limited number of harvesting contracts for specific areas. These contracts, only given to private sandalwood harvesters, stipulate strict quotas, minimum trunk diameter for living trees, ensure only 2/3 the trees are harvested, and require the regeneration of trees by placing seeds in the vicinity of the harvest.

Commercial plantations of S.spicatum were also established in 1999. In the last couple of years we have begun to see the oil from these crops.

**Santalum lanceolatum**

I am even more excited about the sandalwood oil from Queensland, known as Santalum lanceolatum. It grows extensively in the Cape York Peninsula, throughout Queensland to New South Wales and parts of Victoria. S.lanceolatum has been harvested from the Cape York Peninsula region since about 1865. Like S.spicatum, S.lanceolatum wood is obtained from harvesters who have been issued a protected plant harvesting license from the Queensland government, allowing them to monitor the timber that is harvested. The license stipulates strict quotas regarding the amount of harvestable timber and the diameter of the tree must be greater than 12cm in diameter.

In Queensland, the level of harvesting from Crown lands has hovered around 300 tonnes per year for 10 years. The Queensland Nature Conservation Act restricts the level of annual harvest to 500 tonnes from Crown lands and 50 tonnes from freehold land. Unauthorised removal has been a problem in the past and still occurs.

**Pacific Islands Sandalwood**

There are several sources of good quality sandalwood from the Pacific region. Fiji and Tonga produce S.yasi and New Caledonia and Vanuatu produce S.austrocaledonicum. A management program has also been introduced in the Pacific region to ensure the long term sustainability of sandalwood. In Vanuatu, all the forests are owned by custom landowners. These forests play an important part in the lives of the people where sandalwood has been harvested and traded for centuries. The Australian Centre for International Agricultural Research (ACIAR) has supported research into the growth and marketing of sandalwood in Vanuatu. Its goal is to establish a plantation-based sandalwood industry.

While the demand for sandalwood related products continues to increase, I believe that the strategies implemented by Australian governments and farmers will lead to a strong and healthy sandalwood industry so that future generations can continue to enjoy it. While Australia plundered the sandalwood resources of the Pacific Islands in the 19th century, I am relieved that our Government is now taking initiatives to support many of the Pacific Islands by establishing long term sustainable sandalwood industry.

I believe that aromatherapists and perfumers are starting to get used to the idea of using sandalwood oil from sandalwood species other than the East Indian variety. As the trees from the Australian plantations get older, I am sure that we will see sandalwood oils with even higher santalols - the most highly desirable constituent from an olfactory and therapeutic aspect.

**Method of extraction**

Sandalwood oils are obtained by steam distillation of powdered wood chips from the heartwood of the tree. The oil was originally solvent extracted, and to my knowledge it is still possible to obtain the solvent extracted oil. This caused great controversy as it is argued that this was not an essential oil, but an extract and that the chemical profile differs considerably from the distilled oil.

**The S.spicatum oil that Perfect Potion sources is steam distilled from dead wood - this means the trees have naturally fallen over.**

The essential oil yield from old mature S.album trees (greater than 30 years) ranges from 6–7%. The oil content from S.spicatum is only 2% while the oil content of S.lanceolatum is about 2-3%.

**Did you know …**

Australia’s trading relationship with China goes way back to the very early 1800s when Sandalwood from Australia and the Pacific Islands was one of the biggest export commodities. Earlier cash-strapped settlers loved their tea so much that they even engaged in “sandalwood for tea” trade with China.
Traditional uses

Sandalwood and its oil have a long history of uses that date back at least 2,500 years.

Religious
It is widely utilised in religious and social ceremonies. The use of sandalwood and its products became an integral part of Brahmin, Buddhism and other religious rituals. According to Vamana Purana, the wood is recommended for worshipping God Shiva. Goddess Lakshmi is believed to reside in the sandalwood tree. Sandalwood sawdust is blended with gum arabic and other fragrant materials to make incense sticks. A paste of sandalwood powder is applied to the forehead at religious ceremonies by Hindus.

Medical
The oil is traditionally used in Ayurveda, Chinese and Tibetan medical systems. It is used in the treatment of

- the common cold
- bronchitis
- fever
- dysentery
- piles
- scabies
- infection of the urinary tract
- inflammation of the mouth and pharynx
- liver and gall-bladder complaints
- expectorant
- stimulant
- carminative
- digestive
- muscle relaxant

Venous and lymphatic stasis such as varicose veins and swollen lymph nodes of the lymphatic system were also traditionally treated with sandalwood oil. Sandalwood was rarely mentioned in medieval European herbals. It was not until the 18th century that sandalwood was recommended for the treatment of gonorrhoea and urinary tract infections.

The German Commission E Monographs recommend 1-1.5g of sandalwood oil for the supportive treatment of urinary tract infections. According to Lassak, author of Australian Medicinal Plants, S. lanceolatum is commonly known as plumbush. In Australia, a decoction of the leaves and bark were traditionally drunk as a purgative. The leaves were used for boils, sores and gonorrhoea. An infusion was made from the mashed roots and the liquid applied topically for rheumatism and to relieve itching.

Characteristics

There is a temptation to suggest that one sandalwood species is superior to the others. Typically the benchmark is S.album. The Australian sandalwood industry has been criticised for marketing S.spicatum as a substitute for East Indian Sandalwood.

However I am very excited and proud that we now have a plantation sourced S.album from Australia that smells so divine.

<table>
<thead>
<tr>
<th>Species</th>
<th>Colour/viscosity</th>
<th>Aroma</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.album</td>
<td>Pale yellow – Yellow Viscous</td>
<td>A sweet, fragrant, warm, woody aroma with subtle animalic, milky and nutty notes.</td>
</tr>
<tr>
<td>S.spicatum</td>
<td>Pale yellow – Yellow Viscous</td>
<td>A woody and extremely tenacious odour with a dry-bitter slightly resinous top note.</td>
</tr>
<tr>
<td>S.austrocaledonicum</td>
<td>Pale yellow – Amber Viscous</td>
<td>A soft warm, sweet, rich, balsamic, woody odour.</td>
</tr>
<tr>
<td>S. lanceolatum</td>
<td>Pale Yellow – Yellow Viscous</td>
<td>A light, fresh woody aroma with a gentle hint of honey and spice.</td>
</tr>
</tbody>
</table>

The aroma of each of the Sandalwood oils is ever so different and I really suggest that you identify which sandalwood aroma you prefer to use in your blend.
**Chemistry**

The typical chemical profiles of the four main commercially available sandalwood oils are as follows:

<table>
<thead>
<tr>
<th>Constituent</th>
<th>S. album</th>
<th>S. Spicatum</th>
<th>S. lanceolatum</th>
<th>S. austrocaledonican</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-santolene</td>
<td>1.29</td>
<td>0.75</td>
<td>0.51</td>
<td>0.38</td>
</tr>
<tr>
<td>Trans-α-bergamotene</td>
<td>0.25</td>
<td>0.11</td>
<td>0.17</td>
<td>0.07</td>
</tr>
<tr>
<td>Epi-β-santolene</td>
<td>1.33</td>
<td>0.09</td>
<td>-</td>
<td>0.32</td>
</tr>
<tr>
<td>Trans-β-farnesene</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.07</td>
</tr>
<tr>
<td>β-santolene</td>
<td>1.96</td>
<td>0.25</td>
<td>-</td>
<td>0.31</td>
</tr>
<tr>
<td>g-curcumene</td>
<td>0.12</td>
<td>1.05</td>
<td>-</td>
<td>0.22</td>
</tr>
<tr>
<td>AR-curcumene</td>
<td>0.22</td>
<td>1.41</td>
<td>1.12</td>
<td>0.25</td>
</tr>
<tr>
<td>β-bisabolene</td>
<td>0.01</td>
<td>1.11</td>
<td>2.34</td>
<td>0.22</td>
</tr>
<tr>
<td>β-curcumene</td>
<td>0.3</td>
<td>1.83</td>
<td>-</td>
<td>0.45</td>
</tr>
<tr>
<td>Nerolidol</td>
<td>-</td>
<td>1.22</td>
<td>1.82</td>
<td>-</td>
</tr>
<tr>
<td>Trans-nerolidol</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.17</td>
</tr>
<tr>
<td>Epi-β-bisabolol</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.01</td>
</tr>
<tr>
<td>β-bisabolol</td>
<td>1.57</td>
<td>0.68</td>
<td>-</td>
<td>0.70</td>
</tr>
<tr>
<td>cis-α-santolal</td>
<td>47.59</td>
<td>1.78</td>
<td>4.48</td>
<td>25.41</td>
</tr>
<tr>
<td>Epi-α-bisabolol</td>
<td>-</td>
<td>25.01</td>
<td>-</td>
<td>0.60</td>
</tr>
<tr>
<td>Cis-α-trans-bergamotol</td>
<td>6.37</td>
<td>0.22</td>
<td>0.42</td>
<td>5.54</td>
</tr>
<tr>
<td>Cis-epi-β-santolal</td>
<td>3.74</td>
<td>0.18</td>
<td>0.40</td>
<td>1.88</td>
</tr>
<tr>
<td>Epi-α-santolal</td>
<td>-</td>
<td>0.35</td>
<td>1.51</td>
<td>-</td>
</tr>
<tr>
<td>Cis-β-santolol</td>
<td>21.39</td>
<td>0.31</td>
<td>0.23</td>
<td>12.04</td>
</tr>
<tr>
<td>Cis-nuciferol</td>
<td>0.42</td>
<td>8.05</td>
<td>4.59</td>
<td>20.72</td>
</tr>
<tr>
<td>Trans-farnesol</td>
<td>-</td>
<td>0.62</td>
<td>3.31</td>
<td>-</td>
</tr>
<tr>
<td>Trans-β-santolal</td>
<td>1.60</td>
<td>1.95</td>
<td>-</td>
<td>0.16</td>
</tr>
<tr>
<td>Cis-β-curumen-12-ol</td>
<td>5.95</td>
<td>6.78</td>
<td>8.65</td>
<td>-</td>
</tr>
<tr>
<td>Cis-lanceol</td>
<td>1.77</td>
<td>5.73</td>
<td>22.08</td>
<td>9.37</td>
</tr>
<tr>
<td>α-sinensal</td>
<td>-</td>
<td>1.28</td>
<td>3.59</td>
<td>-</td>
</tr>
</tbody>
</table>

*S. album* essential oil typically contains over 90% santalols. The major constituent of the oil, α-santolol is responsible for the most biological activities of sandalwood oil. The santalols are known to add to the fine woody notes of East Indian sandalwood. The essential oil from *S. spicatum* contains less santalols than *S. album*, however, it also contains bisabolols, farnesol and nuciferols that are said to enhance the anti-inflammatory and anti-microbial properties of the oil. Kerr says that the presence of bisabolols, which are also found in German Chamomile, contribute to the oil’s anti-inflammatory properties. He adds that farnesol is also found in floral oils such as rose, jasmine and ylang ylang.
Perfumery

Without a doubt, sandalwood is considered one of the most precious perfumery materials from antiquity to modern times and the popularity of sandalwood oils shows no signs of waning.

The desirable attributes of sandalwood in perfumery are due to the sesquiterpene alcohols, α-santalol and β-santalol, being great fixatives.

Most Indian attars use sandalwood oil as the base because of its inherent capacity to absorb most of the ethereal notes of other herbs and flowers.

Pharmacology

A recent in-vitro study has shown that S. album essential oil has antibacterial activity against Helicobacter pylori, a gram-negative bacterium which is strongly linked to the development of duodenal, gastric and stomach ulcers. Dwivedi and co-workers have shown the chemo-preventive effects and the molecular mechanisms of α-santalol on skin cancer development in both animal models and skin cancer cell lines.

α -santalol caused significant physiological changes such as relaxing and sedative effects, whereas sandalwood oil provoked physiological deactivation but behavioural activation after transdermal absorption.

Misra and Dey suggest that because α-santalol is a strong inhibitor of both tyrosine and cholinesterase in-vitro, there is potential for using sandalwood oil in the treatment of Alzheimer’s. α-santalol was also found to be a strong antagonist of dopamine D2 and serotonin 5-HT2A receptor binding. Furthermore, the effect of α-santalol was the same as that of chlorpromazine as an antipsychotic agent.

The anti-inflammatory activities of Australian sandalwood were significant against UV-induced inflammation. The research involved testing the ability of the essential oil to inhibit the enzymes responsible for the inflammatory reaction at a cellular level.

Lassak cites Beyler, who obtained good results with S. spicatum essential oil against Staphylococcus aureus, whereas the almost chemically identical East Indian sandalwood reported negligible activity.

Australian sandalwood exhibited greater bacteriostatic activity against the yeast Candida albicans than tea tree. Other in-vitro studies have also confirmed that Australian sandalwood is an excellent biocide against many gram-positive organisms, including Staph. aureus and methicillin-resistant Staph. aureus (MRSA) in addition to the organism responsible for acne, thrush and tinea.

I believe that the chemical diversity of the Santalum spicatum species make it more effective as an anti-inflammatory and antimicrobial oil. On the other hand, sandalwood oils with a higher percentage of santalols may exhibit a stronger influence on the nervous system.

Properties

anti-inflammatory, antiseptic, astringent, demulcent, expectorant, sedative

Uses

Sandalwood is commonly used in aromatherapy as follows;

Nervous system: anti-depressant, reducing nervous tension, stress and insomnia.

Fischer-Rizzi perfectly describes sandalwood’s effects on the nervous system;

“With sandalwood, the experience of warmth and balance fills the human heart with joy. This makes it an ideal remedy for nervous depression, fear, stress and a hectic daily tempo. When you react to others with aggression and irritation, it is time to reach for sandalwood.”

Respiratory system: chest infections, bronchitis, catarrh, dry cough, laryngitis, sore throat, stimulating the immune system

Circulatory system: decongestion of the lymph and venous systems, varicosities

Urinary system: Cystitis, kidney and bladder inflammation or congestion, pelvic and prostate congestion

Skin care: dry, aged skin, acne, oily skin, cracked and chapped skin, sunburn, inflammatory symptoms from psoriasis

Personality profile

Worwood best describes the typical sandalwood personality as serene and in charge of their emotions. They are fully aware of their direction in life, even anticipating the rocky sections ahead. She says that their inner calm is like that of an old soul.

Sandalwoods are very intuitive. Worwood says it is as if they have a direct line with the universal telephone exchange and instinctively know when something is missing or not quite right. They may long for the meaning of life, appealing to the heavens to reveal a little more. They have a laidback philosophical attitude that mistakenly leads them to be accused of detachment. They are very still people who listen more than talk. She says that they also make wonderful healers.

Sandalwood personalities are very sensuous. Sex is important to them. They are not afraid of their sexuality and will view it as one of the precious gifts we have been given to help us through this lifetime.

They are easy-going and comfortable, making them self-assured, calming people to be with.

Fischer-Rizzi says;

“Sandalwood aids people who want to make human contact and overcome isolation. Sandalwood helps them accept others with an open heart and diminishes their egocentricity. Sandalwood fosters openness, warmth and understanding.”

According to Myers Briggs personality profile types, I would describe a sandalwood personality as INFP (Introversion, Intuition, Feeling, Perceiving). INFPs are gentle, calm, easy going and affirming. Integrity and commitment to what they believe in is essential. They like time alone for their many interests. They like learning and researching new things and interests. They are highly reflective, especially in understanding the mysteries and meaning of life.
Subtle aromatherapy
Sandalwood's subtle properties are reflected in its traditional use as an aid to meditation, prayer and spiritual practice.

Mojay says that its soft woody aroma helps to reduce the tyranny of intellect, of the incessant need to overthink. It instills in its place an experience of inner unity. A state where the body, mind and spirit can re-align as one.

Sandalwood is often referred to as the fragrance of the subtle body. It is assigned to the base chakra as well as the crown chakra. Fischer Rizzi asks – *How can an essential oil be assigned to the base chakra and the highest chakra?*

She explains that sandalwood oil has the ability to awakens the power of the kundalini, helping to connect all the chakras.

Energetics
The energetic qualities of sandalwood oil are cooling. In TCM sandalwood is indicated for conditions of a hot, inflammatory and catarrhal nature.

Mojay also says that sandalwood’s influence on the mind and spirit relate to its cooling and calming influence on the nervous system. He recommends it for hot, agitated, emotional states that lead to headache, insomnia and nervous exhaustion.

In Ayurveda, sandalwood is valued for reducing conditions associated with excess Pitta.

How to use

**Bath:** Typically for a full body bath in a tub, use up to 5 drops of essential oils in the tub of warm water. Foot or hand baths may be prepared by adding 2-3 drops of essential oil to a bowl of warm water.

**Massage:** Use a 2.5% dilution of the appropriate blend of essential oils to the chosen carrier oil. A 2.5% dilution equates to 5 drops of essential oil to 10mL of carrier oil.

**Inhalation:** The best way to use essential oils for inhalation is by diffusing them. When you are using essential oils in an ultrasonic diffuser please follow the instructions of the diffuser that you are using.

Blending tips
Perfumer, Roja Dove best explains the challenges of creating perfumes with sandalwood;

> "It is a difficult material to balance in a creation, as it plays a trick with one's nose – at one moment it is there and then it disappears."

The soft, sweet, woody, balsamic aroma of sandalwood also makes it one of the most beautiful oils to blend with. It does not impart a strong aroma, however it leaves you with a very long lasting scent and it has the ability to enhance the other oils used. It imparts such a delicate ethereal, balance and harmony to all blends.

The perfume industry tends to consider sandalwood as a fixative. However the high price of sandalwood now means that perfumers use it much more carefully.

Generally I would recommend using sandalwood oil up to 5-10% of your essential oil blend. Taking into consideration how precious and expensive this oil is, I also prefer to use it in perfumes, blends for subtle aromatherapy and in skincare preparations.

I particularly like to use sandalwood with floral oils – especially neroli, rose and jasmine. It beautifully balances the intense floral aroma of these oils.

Sandalwood blends well with all aroma types, but I think it is best suited to florals and other warm, woody, earthy aromas. Sandalwood perfectly complements the fresh, vibrant scent of all citrus oils. At the same time, it harmonises with rich, warm resins such as frankincense, cistus or peru balsam.

Generally I would not use sandalwood with spicy, herbaceous or camphoraceous oils unless for its aromatherapeutic effects where you want to take advantage of its antimicrobial properties or beneficial effects on the respiratory system.

**Perfect Potion classics with Sandalwood**

Nowadays we tend to use the Western Australian sandalwood in our blends, however, I hope to start using the Vanuatu and Queensland sandalwood in some of our new blends.

It is not surprising that sandalwood oil is in our crown chakra blend – **Cosmic**. Our **Chakra Balancing Mist and Massage Oil** wouldn’t do a good job of balancing the chakras without the inclusion of sandalwood oil.

It works very hard in **Green Goddess blend** to balance 22 other essential oils!!

It truly helps to create the heavenly aroma of our sacred space blend – **Desert Dreaming**. Sandalwood’s energetic qualities are cooling, so it soothes and calms Fire and Pitta energy - hence it is used in our **Pitta and Fire blends**. It also enhances the meditative qualities of **Earth**, and in **Allure** it is used for enhancing the sensuality of jasmine. It also balances the strong aromas of eucalyptus and kunzea in the **Great Outdoors Blend**.

Each of these blends is so unique – this is what makes sandalwood so desirable in a blend. It helps to enrich and enhance the qualities of the oils it is blended with.

Where its soothing and anti-inflammatory qualities are required, sandalwood is such a precious addition to many of our skincare preparations. You will find it in **Bare Faced Exfoliant, Sandalwood & Palmarosa Moisture Cream** and in our soothing and cooling **Pure Plant Hydrating Serum**.

One of my all-time favorite body care products is **Aftersun Rescue Gel**. It is a blend of sandalwood, lavender and aloe vera - such a soothing product to use on the skin if you have carelessly spent time in the sun.

We also make good use of the soothing qualities of sandalwood in our **Beautiful Baby range**.

In **Shanti peace perfume**, sandalwood balances the rich floral aroma of jasmine, while in **Heiwa** it creates perfect harmony with Yuzu oil to create such a delicate, fresh and lightly woody perfume.

I almost forgot the divine and heavenly **Perfect Passion Massage Oil** - such a simple synergy of rose absolute and jasmine absolute.

My favorite of all Perfect Potion sandalwood blends would have to be **Connection Pulse Point.** This is
a divine blend of jasmine sambac, sandalwood and kewda. Kewda is an attar, which means that the flowers of the pandanas palm are gently distilled over sandalwood oil.

**Safety**

Typically all sandalwood oils are considered non-toxic, non-irritant and non-sensitising. No contraindications known.

However, Tisserand references a study which conducted a patch test on 3,542 dermatitis patients with 2% sandalwood (S.album) oil. Only 12 (0.345%) had a reaction. He says based on this information and because of the risk of photo-allergic reactions, he recommends a maximum use level of 2%.

He also suggests that the safety profile of other sandalwood oils would be similar to East Indian sandalwood because of similar chemical profiles.

**References**

- A.M Radomiljac et al, *Sandal and its Products: Proceedings of an international seminar held on 18-19 December 1997, organised by the Institute of wood Science and Technology (ICFRRE) and Karnataka State forest Department, Bangalore, India*. ACIAR Proceedings No. 84.