

The Ananda Apothecary Blog

Scientific Research Shows Sandalwood EO Improves Sleep, Kills Cancer Cells, and May Stimulate Skin Healing

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We absolutely love [Sandalwood essential oil](#). Each and every species and source. They all have unique aromas, yet 'overlap' in their natural chemistry. [Sandalwood](#) is one of the world's most widely used [essential oils](#), prized for its scent by perfumers around the globe, as well as for its therapeutic effects in a number of traditional medicine systems.



Sandalwood is one of the world's oldest natural medicines, and most prized aromatics.

The essential oil is steam distilled from the heartwood of a parasitic tree found in tropical environs...it's a tree that grows on other trees, and needs to be at least 20 years old (and *that is young*, 40-80 y.o. makes for a better oil) before it is harvested for oil production. Human cultivation has been taking off, with re-planting of the trees making up for what was becoming a scarce commodity. (Our [Royal Hawaiian](#) and [New Caledonian 'Fine'](#) [Sandalwoods](#) are from plantation-based distillers!)

[Research into Sandalwood's Broad Reaching Health Potential](#)



One of our wonderful, high-santalol Sandalwood essential oil varieties.

The essential oil has been the subject of a great number of scientific studies, investigating its effects on *sleep*, its *anti-cancer activity*, and its *stimulation of skin healing*. Much of the research notes the potential health benefits appear to come from natural chemicals known as ‘sesquiterpene alcohols’, specifically α - and β -santalol, found in a ratio in the oil of approximately 2.5:1, respectively. Other aromatic constituents include santalol, santyl acetate, and santalene.

Sandalwood Essential Oil and Sleep

This study showed markedly improved sleep patterns with santalol, molecules found primarily in Sandalwood essential oils. The study notes that it is not particularly the aroma of the oil component, but its physiological effects not associated with the olfactory system. This implies that Sandalwood oil, simply topically applied before bed, may support regular sleep patterns.

Study: Effect of santalol on the sleep-wake cycle in sleep-disturbed rats.

From Nihon Shinkei Seishin Yakurigaku Zasshi. 2007 Aug;27(4):167-71. (Article in Japanese). Authors: Ohmori A1, Shinomiya K, Utsu Y, Tokunaga S, Hasegawa Y, Kamei C.



Sandalwood trees being cultivated at a Sandalwood plantation.

Abstract: Sandalwood oil is widely used in aromatherapy for alleviating various symptoms. Santalol, a major component of sandalwood oil, has been reported to have central nervous system depressant effects such as sedation. In the present study, we investigated the effect of santalol on the sleep-wake cycle in sleep-disturbed rats. When inhaled at a concentration of 5×10^{-2} ppm, santalol caused a significant decrease in total waking time and an increase in total non-rapid eye movement (NREM) sleep time. In order to clarify the mechanism of action, olfactory hypofunction (the sense of smell was inhibited) was caused in rats by intranasal application of 5% zinc sulfate solution, and thereafter the effects of inhalation of fragrances were evaluated. In this study, it was found that the impairment of the olfactory

system showed no significant effect on the changes in sleep parameters induced by santalol. This result suggests that santalol may act via the circulatory system rather than the olfactory system. That is, santalol is thought to be absorbed into the blood through the respiratory mucosa, and then exert its action. From these results, it is concluded that santalol may be useful in patients having difficulty maintaining sleep without being affected by individual differences in perfume-related preference.

Sandalwood Essential Oil's Anti-Cancer Activity

Sandalwood essential oil has been the subject of a number of studies demonstrating anti-cancer activity, with most of the research on pubmed.gov focusing on skin cancers. We'd previously posted evidence of [Sandalwood oil's cancer preventative actions](#), which is further confirmed in the research presented below. In the research we have read, while alpha-santalol alone appears to produce potential therapeutic results, the 'whole' oil is frequently noted as more effective.

Study: A novel chemopreventive mechanism for a traditional medicine: East Indian sandalwood oil induces autophagy and cell death in proliferating keratinocytes.

From: Arch Biochem Biophys. 2014 Sep 15;558:143-52. doi: 10.1016/j.abb.2014.06.021. Epub 2014 Jul 5. Authors: Dickinson SE1, Olson ER2, Levenson C3, Janda J4, Rusche JJ4, Alberts DS5, Bowden GT6

Abstract: One of the primary components of the East Indian sandalwood oil (EISO) is alpha-santalol, a molecule that has been investigated for its potential use as a chemopreventive agent in skin cancer. Although there is some evidence that alpha-santalol could be an effective chemopreventive agent, to date, purified EISO has not been extensively investigated even though it is widely used in cultures around the world for its health benefits as well as for its fragrance and as a cosmetic. In the current study, we show for the first time that EISO-treatment of HaCaT keratinocytes results in a blockade of cell cycle progression as well as a concentration-dependent inhibition of UV-induced AP-1 activity, two major cellular effects known to drive skin carcinogenesis. Low concentrations of EISO were found to induce HaCaT cell death, although not through apoptosis as annexin V and PARP cleavage were not found to increase with EISO treatment. However, plasma membrane integrity was severely compromised in EISO-treated cells, which may have led to cleavage of LC3 and the induction of autophagy. Together, these effects suggest that EISO may exert beneficial effects upon skin, reducing the likelihood of promotion of pre-cancerous cells to actinic keratosis (AK) and skin cancer.

Study: Alpha-Santalol, a derivative of sandalwood oil, induces apoptosis in human prostate cancer cells by causing caspase-3 activation.

From: Phytomedicine. 2012 Jun 15;19(8-9):804-11. doi: 10.1016/j.phymed.2012.04.003. Epub 2012 May 7. Authors: Bommareddy A1, Rule B, VanWert AL, Santha S, Dwivedi C.

Abstract: The anticancer effects of alpha-santalol, a major component of sandalwood oil, have been reported against the development of certain cancers such as skin cancer both in vitro and in vivo. The primary objectives of the current study were to investigate the cancer preventive properties of alpha-santalol on human prostate cancer cells PC-3 (androgen independent and P-53 null) and LNCaP (androgen dependent and P-53 wild-type), and determine the possible mechanisms of its action. The effect of alpha-santalol on cell viability was determined by trypan blue dye exclusion assay. Apoptosis induction was confirmed by analysis of cytoplasmic histone-associated DNA fragmentation using both an apoptotic ELISA kit and a DAPI fluorescence assay. Caspase-3 activity was determined using caspase-3 (active) ELISA kit. PARP cleavage was analyzed using immunoblotting. alpha-Santalol at 25-75 μ M decreased cell viability in both cell lines in a concentration and time dependent manner. Treatment of prostate cancer cells with alpha-santalol resulted in induction of apoptosis as evidenced by DNA fragmentation and nuclear staining of apoptotic cells by DAPI. alpha-Santalol treatment also resulted in activation of caspase-3 activity and PARP cleavage. The alpha-santalol-induced apoptotic cell death and activation of caspase-3 was significantly attenuated in the presence of pharmacological inhibitors of caspase-8 and caspase-9. In conclusion, the present study reveals the apoptotic effects of alpha-santalol in inhibiting the growth of human prostate cancer cells.

Sandalwood Oil and Skin Healing

And finally, Sandalwood may initiate new skin cell development through the stimulation of olfactory cells in our skin. According to a press release from the Ruhr-Universität, Germany: “Skin cells possess an olfactory receptor for sandalwood scent, as researchers at the Ruhr-Universität Bochum have discovered. Their data indicate that the cell proliferation increases and wound healing improves if those receptors are activated. This mechanism constitutes a possible starting point for new drugs and cosmetics. The team headed by Dr Daniela Busse and Prof Dr Dr Dr med habil Hanns Hatt from the Department for Cellphysiology published their report in the *Journal of Investigative Dermatology*.” See more at <http://aktuell.ruhr-uni-bochum.de/pm2014/pm00107.html.en>

Thanks for reading!