

# Fragrant Products From Less Odorous Sandalwood Oil

By K. H. Shankaranarayana and B. S. Kamala, Sandal Research Centre, Institute of Wood Science & Technology, Malleswaram, Bangalore-560003, India

The sandal tree (*Santalum album* L.) is exploited mainly for its scented heartwood which gives the fragrant sandalwood oil upon steam distillation. Yields are from 2.5-6.2% depending upon the age of the tree and the color of heartwood. The great fixative property and the tenacious aroma of sandalwood oil principally are because of its major odoriferous sesquiterpenic constituents—alpha and beta santalol, forming more than 90% of the oil. Some minor constituents like alpha and beta santalene (1.5-3.0%) and other oxygenated sesquiterpenes (2.5-4.0%) to some extent also contribute to the overall odor character of the oil.<sup>1,2</sup>

## Analysis of the Study

During the analysis of a large number of heartwood samples, we encountered some well

grown sandal trees, producing heartwoods, which are less scented. On distillation, the heartwood of these trees produced a reduced amount of essential oil (1.5-3.0%). This lower oil content also was reflected in reduced amounts of alpha- and beta-santalol (65-75%) and increased amounts of alpha- and beta-santalene (5-8%), and other oxygenated sesquiterpenes (5-12%). These oils possess a poor odor quality as compared with the normal sandalwood oil. Because of this and their reduced santalol content, these oils have not been accepted as raw materials in the cosmetic and fragrance industries.

In the present study, the utilization of these less odorous sandalwood oil samples is examined. It has been found that direct esterification of the less odorous oil with caproic acid (hexanoic acid), cinnamic acid and isobutyric acid gave rise

Table I.

Acid (gms)	:	caproic-6	cinnamic-5	isobutyric-4.5
Sandalwood oil (gms)	:	9	10	10
Yield (gms)	:	8.7	7.8	8.5
Refractive Index (28°C)	:	1.473	1.507	1.508
Color	:	golden yellow	pale yellow	pale yellow
Odor	:	fruity, intensely sweet	intensely camphoraceous	fresh herbal

to highly fragrant products. Such aroma materials could become commercially valuable for their long-lasting stable notes; they could find extensive use in floral fragrances, essences and perfume blends.<sup>3,4</sup>

### Esterification

A mixture of the less odorous sandalwood oil, 25 ml benzene, 1 ml sulphuric acid and a quantity of either caproic acid, cinnamic acid or isobutyric acid is refluxed for six hours. After cooling the mixture it was washed first with water, then with dilute alkali, and finally with brine. The solvent was removed in a rotary film evaporator after which time the crude product was steam distilled for 24 hours to yield the appropriate ester rich oil. The description of esterified oil, aroma and yield information can be seen in Table I.

### Conclusion

This study has shown that fragrant products can be obtained by direct esterification of the less

odorous sandalwood oil with either caproic, cinnamic or isobutyric acids. It is hoped that this study demonstrates the opportunities that are available for the production of potentially useful products from items once thought to be of low or poor commercial value.

### References

Address correspondence to K. H. Shankaranarayana, Sandal Research Centre, Institute of Wood Science & Technology, Malleswaram, Bangalore 560 003, India

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