

Sandalwood Notes in Perfumery

Société Française des Parfumeurs event celebrates the versatility of natural and synthetic sandalwood materials.

Since 1750, 46% of some 7,000 classified fragrances have employed sandalwood notes, said Mario Di Lallo (TFS Corp./Mount Romance) during a presentation given at the February meeting of the Société Française des Parfumeurs (SFP; www.parfumeurs-createurs.org) in Neuilly sur Seine, just outside Paris. Scents such as *Chanel No. 5*, *Fahrenheit* and *Samsara* are prime examples of this note's lasting influence.



From left, speakers Alain Alchenberger and Markus Gautschi (both Givaudan), Stéphane Piquart (Behave), and Mario Di Lallo (TFS Corp./Mount Romance).

Indian Sandalwood From Australia

Indian sandalwood oil (*Santalum album*) has long been valued due to its fixative properties and naturalness, said Di Lallo. However, overharvesting; poor resource stewardship, including poaching of sandalwood trees in India; and adulteration of oils reaching the market have threatened the ingredient's supply. While perfumers have found synthetic alternatives or supplements, sustainable natural product is being grown and harvested in Australia.

TFS has been growing sandalwood in the country's tropical north since the late 1990s. Today, its plantation is three times the size of Monaco, comprising 2.6 million sandalwood trees. These trees have been hand planted alongside "host" plants that provide nutrients. The entire process, said Di Lallo, represents a 15-year investment.

The essential oil yield is about 3.7%, he continued. The oil being produced in Australia comprises 49% Z- α -santalol

and 20.8% Z- β -santalol. The cost in use is still prohibitive for fragrance applications outside premium fine fragrance, said Di Lallo, but a good security of supply has been established. Aside from fragrance, Indian sandalwood is sold to carving and traditional medicine industries, attar producers and ayurvedic medicine applications in which sandalwood is prized for its antimicrobial, antifungal, antibacterial, and anti-inflammatory activities. He concluded that even with plantings of 1,000/ha a year in Australia, there is insufficient Indian sandalwood oil to meet global demand.

Synthetic Sandalwood Notes: a Timeline

Pricing for Indian sandalwood oils has continued to rise, noted a presentation by Markus Gautschi and Alain Alchenberger (both Givaudan), and so research into sandalwood oil alternatives has long been an area of focus. To illustrate, the presenters provided a timeline of sandalwood note chemistry:

- Z-(-)- β -Santalol first had its structure elucidated in 1935 by Ruzicka and Thomann, and in 2011 Fehr et al. at Firmenich published an "industrially feasible" synthesis.
- Research leading to Sandela dates back to 1942^a. The material has been used at 17% in *Lumiere Rochas* and 15% in *Ombre Rose*. Sandela use breaks down as: 6% hair care, 44% personal care, and 25% each fine fragrance and fabric care.

Next Meeting: International Exhibition of Raw Materials for Perfumery

The SFP will hold its raw material exhibition June 19–20 at Paris' Espace Champerret. For more information, visit www.parfumeurs-createurs.org. For more on this and other meetings, visit www.perfumerflavorist.com/events.



From left, Thierry Duclos (Quimdis), Danae Christensen (TFS), Stéphane Piquart (Behave) and Oliver Blackburn (Claridge's [London]).



Jean-Jacques Etienne presented a tribute to the late Patrick Pellerin, who recently passed away. Pellerin, a chemistry engineer and physics graduate, began his career as a manager of the applied chemistry laboratory of Ets Lautier from 1967 to 1980. He later joined Sté Camilli, in Grasse, where he was director for new developments and new products. There, he pioneered supercritical CO₂ extraction during the years 1980–2003 while the company became CAL Pfizer. Starting in 2004, he served as an international consultant, and provided counsel on the extraction and valorization of aromatic and medicinal plants in several countries. As part of the Pôle de compétitivité Parfums Arômes Senteurs Saveurs (Pôle PASS) in Grasse, he helped foster relationships in countries on the south side of the Mediterranean Sea with partners who joined the Union pour la Méditerranée (UPM). Pellerin was the chairman of the scientific board of the “Journées Internationales des Huiles Essentielles et Extraits,” which takes place every year in Digne les Bains. He was also a member of the International Association for the Promotion of Extraction by Supercritical Fluids and a member of the Mediterranean Club of Expert Chemists. For several years, he organized with Marie-Christine Grasse, then curator of the Musée International de la Parfumerie (M.I.P.), the event “One Day, One Plant,” which took place in Grasse for the annual French “Heritage Days.”



Mario Di Lallo, TFS Corp./Mount Romance, speaking of alternative sources of Indian sandalwood oil.

- In 1971, Ansari (Bush Boake Allen [now IFF]) published research on Osyrol. The material has been used at 9% in *Flowerbomb* and 4% in *Donna Karan Women*. Ninety-five percent of Osyrol is used in fine fragrance.
- Sandalore and Sandal Mysore Core were discovered in 1976 and 1978, respectively^b. Sandal Mysore Core, like Bacdanol, was a derivative of campholenal^c. Sandalore is applied at a dose of 14% in *Tom Ford Amber Absolute* and 7% in *Egoïste* Chanel. About 57% of Sandalore is used in personal care. Bacdanol's main usage areas are personal care (43%) and fabric care (30%).
- Polysantol and Ebanol were discovered in 1984 and 1986, respectively^d. Polysantol is applied at a dose of 1% in *Samsara* Guerlain and 3% in *212 Carolina Herrera for Men*. About 72% of Polysantol is used in fine fragrance. About 74% of Ebanol is used in fabric care.
- Javanol, discovered in 2000, has been dosed at 1% in *Acqua di Parma Colonia Essenza* and 4.8% in *Comme des Garçons Wonderwood*. About 81% of Javanol is used in fabric care.
- Pashminol, from 2009, has been dosed at 2% in *Comme des Garçons*. About 90% of the material is used in fine fragrance.



SFP president Patrick Saint-Yves thanked the speakers and attendees for a successful event.

As they closed the talk, Gautschi and Alchenberger noted that it is just as important to optimize existing syntheses as it is to create new molecules for perfumery.

As the attendees concluded the evening's event, Oliver Blackburn, head bartender at London's Claridge's, concocted a sandalwood-tinged cocktail—a delicious end to a fascinating evening.

^a Sandela is a trademark of Givaudan; the presenters noted that various companies launched versions: Sandel (Haarmann & Reimer [now Symrise]), Sandiff (IFF) and Santalex T (Takasago).

^b Sandalore is a trade name of Givaudan; Sandal Mysore Core is a trade name of Kao.

^c Bacdanol is a trade name of IFF.

^d Polysantol is a trade name of Firmenich; Ebanol is a trade name of Givaudan.

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