Naturals Heritage, Ethical Future

Technology and sustainable initiatives intersect in F&F ingredients

Pictured during the 2010 World Perfumery Congress in Cannes, France, are Eliana Afonso (Mane Brazil), Celine Roche (Mane USA), Mirko Tomazelli (Mane Brazil) and Wendy Diamond (Mane USA).

Forthcoming changes to EU flavor regulations; consumer trends surrounding notions of health, wellness and sustainability; the specter of commoditization; and the need for new signature effects for formulations have driven the evolution of naturals. Powering this evolution are sourcing strategies and technological innovations that create new and differentiated natural ingredients for flavors and fragrances. A recent visit to Provence, France, and discussions there with Mane's fragrance division director (EMEA), Christophe Marin; vice president of specialty ingredients (EMEA), Jean-Pierre de Mattos; ingredients account manager Christian Eberhardt; and vice president, specialty ingredients, Americas, Celine Roche, shed light on these issues, natural ingredients and the role of technology in a sustainable future.

Based in Bar-sur-Loup and founded in 1871, Mane affords a look at the past and future of flavor and fragrance ingredients and formulation. The two facilities there, Notre Dame and La Sarrée, produce natural extracts, molecules, aroma chemicals and specialties, in addition to housing R&D activities, creative work, automated fragrance and flavor blending, and encapsulation activities.

Mane's Notre Dame facility in Bar-sur-Loup, France, is home to the company's R&D activities and natural products and molecules manufacturing, in addition to creative work.

As the industry, and the company, emerged from a difficult 2009, Mane has continued to invest in ethical sourcing, technology and facilities to support innovation required by today's marketplace, particularly in light of the emergence of "cultural creatives." This group, the company notes, have emerged around the world and are "responsible, willing to protect the environment, enhance quality of life, promote social justice, create a sustainable society, and therefore are part of the green movement." The continued focus on this movement coincides with 2010, the United Nation's declared year of biodiversity (*www.cbd.int/2010/welcome/*), which partners with corporate and nongovernmental organization stakeholders to safeguard the Earth's biodiversity. And so, beyond simply highlighting traditional expertise in naturals, Mane and its competitors are pushed to pursue "ethical technologies." Rather than seeing technology as antithetical to sustainability, this outlook harnesses innovation—particularly green chemistry and supercritical CO_2 extractions—to solve threats to biodiversity.

In 1995, just up the mountain from its Notre Dame site, Mane opened its La Sarrée facility for automated fragrance and flavor blending and encapsulation activities and, today, supercritical fluid extraction (CO_2).

Ethical Technologies

In 1998, P.T. Anastas and J.C. Warner published 12 principles of green chemistry, which include prevention of waste; atom economy; low- or non-toxic chemical syntheses; safer chemical, solvent and auxiliary design; energy efficiency; emphasis on renewable feedstocks; reduction of derivatives; preference of catalytic reagents over stoichiometric reagents; design for degradation; in-process, real-time analysis for pollution prevention; and design for safer chemistry for accident prevention.

Mane has pursued green chemistry principles—"doing more with less"—to drive patented aroma chemical synthesis from renewable resources to protect the environment, stabilize ingredient supply, and conform to current and future regulatory requirements. Using crystallization units of different conceptions, high pressure reactors and clean oxidation using ozone chemistry, the company currently produces aroma chemicals employing total synthesis, hemi-synthesis and biosynthesis from natural product isolates.

During the visit to Mane's facilities, the subject of green chemistry was raised in the context of materials for natural fragrances that have both interesting olfactive facets and fewer allergens—and a more ethical stance. These captive ingredients provide perfumers with a competitive advantage in meeting the demands of new product introductions. Mane's green chemistry activities, for instance, played a role in its work for Ushuaia's line of Ecocert certified products, including deodorant and skin care.

Meanwhile, like other industry players, Mane is pursuing alternate methods of flavor and fragrance chemical production, including biotechnology. The company currently employs enzyme and fermentation processes to develop flavor and fragrance ingredients that are natural and yet possess unique facets not found in nature. Mane's biochemical activities began in the flavor realm, but have expanded to the development of chiral natural fragrance materials.

The company supports its chemical and biochemical R&D programs with analytical research activities, which aid in the detection of low-threshold natural molecules.

The visit to Mane's La Sarrée site included a tour of its recently installed supercritical fluid extraction (CO_2) facility where both captive and commercially available natural ingredients are produced from both solid and liquid materials. While the solvent performs well in harnessing aromatic chemicals, it is also non-flammable/explosive, leaves behind no solvent residue, features low VOC emissions, creates new types of materials, is allowable as natural and is Ecocert Greenlife approved. The gentle, low-temperature extraction process consists of a single step of a duration of less than two hours. At low pressure, the process extracts an essential oil; at high pressure it yields an oleoresin. Yields for various materials are as follow: seeds 1–15%, roots 0.5–8.0% and dry materials 2–20%. The parameters of supercritical fluid extraction have been applied to a number of products, including pink pepper, which is spicy, peppery, floral, terpenic and citrusy; red seaweed, which is mossy, woody, iodized and herbal; apple brandy, which is fruity, alcoholic and applelike; cardamom, which is spicy, aromatic, eucalyptus, fresh and fruity; coffee, which is gourmand, bitter, powdery and persistent; juniper berry, which is aromatic, spicy, green and terpenic; orris, which is woody, floral, green and fruity; and rum, which is fruity, alcoholic, woody, rum and bananalike.