

# Mint: Perspectives from Field to Formulation

Mint profiles continue to evolve as crops face drought and other challenges.

There are a range of mint and menthol products applied to flavors and fragrances in segments such as personal care, oral care, confectionery, tobacco and beverages, among others. Recently, *P&F* discussed the state of mint with a range of experts on cultivation, production and application to learn more about the state of this key tonality.

## Farmers Wait-and-See

In the United States, precipitation has been a story of feast or famine. In the Pacific Northwest, Washington's Yakima Valley has been hit by significant drought. This has negatively impacted this key mint production area, which yields about 3.5 million pounds of mint a year, according to agricultural advocacy group Washivore.

Meanwhile, says John Cheatham (Lebermuth), Indiana has received ample, if not excessive, rainfall, which created spotty flooding of fields. This has created "a little pain" for mint growers, lowering yields to some degree, but nothing on the scale of Yakima, where some second cuts of spearmint were abandoned due to water shortages.

Cheatham says Oregon yields have been relatively good this year, while Idaho has suffered high heat, which has increased menthofuran levels in crops. That said, Cheatham says it is possible to find the right mint for the right customers and that mint is in a good state overall.

Mint farmers in the Northwest are in a wait-and-see state at the moment as the entire region waits for the forthcoming impacts of an El Niño weather pattern. Midwest growers, on the other hand, are hoping for more "average" seasons, says Cheatham.

## Improving Processing Case Study: Black Mitcham

Natural products, including mint, can be water-intensive. From crop irrigation to steam distillation, a natural product's water demands can negatively impact its sustainability profile in comparison to synthetic counterparts, particularly when energy expenditures are factored in. As such, natural product producers have worked to improve processes to better optimize CO<sub>2</sub> and water footprints.

For example, at Malshanger Farm in Hampshire, England, where Sir Michael Colman produces Black Mitcham mint for Summerdown mint products (tea, chocolates and personal care), an improved cooling tower system has boosted the efficiency and sustainability profile of this unique mint product. The 2,500 acre



Washington's Yakima Valley, a key mint producer, has been hit by significant drought.

farm produces 1.5 tonnes of peppermint oil, 400 kilos of organic lavender oil (the majority of which is devoted to application in Neal's Yard Remedies), some chamomile oil, cereal crops and oilseed rape.

The mint is native to England, but was optimized in the United States to improve its resistance to strains such as climate, disease and fungus. Malshanger Farm Black Mitcham mint is a single-estate product with unique sensory properties.

Writing for *P&F* in 2014, John Wright and co-authors Ruth Mastenbroek and Rob Tyszkiewicz discussed the ingredient and its application potential. The authors noted that the major components of the oil include typical constituents such as laevo menthone, 1,8-cineole and germacrene D, as well as enhanced levels of *cis*-sabinene hydrate, *cis*-ocimene, linalool, *cis*-3-hexenol, eugenol and isovaleraldehyde.

In flavors, Wright noted that Black Mitcham oil can be used in blackcurrant, passion fruit, raspberry, melon, lychee, peach and blueberry profiles. Meanwhile, Mastenbroek suggested that the oil could be combined with spearmint and work well with citrus, green and fruity notes. It can also support fragrance types such as citrus colognes and masculine fougères, as well as orris/sandalwood types and marine notes, among other applications.

To optimize the company's sustainable production of mint and other oils, Malshanger Farm partnered with Albion Cooling Systems Ltd. to improve water usage. The farm needed to quickly cool heated water from 75°-80°C to 30°C so that it could be efficiently reused. Albion, which has installed cooling towers and filtration equipment at several flavor and fragrance industry



*In flavors, Black Mitcham oil can be used in blackcurrant, passion fruit, raspberry, melon, lychee, peach and blueberry profiles.*

production sites, supplied the farm with a second cooling tower to supplement an existing induced draft counter-flow tower. This boosted throughput and efficiency, according to Albion's managing director, Martin Robinson.

For the mint farmer, ease of maintenance and installation are critical. As a result, the pre-assembled cooling tower was designed to be off-loaded with a forklift. According to an Albion announcement, "The water used [at Malshanger Farm] is abstracted from the farm's own borehole and softened due to the chalky terroir." The majority of the water used in the distillation process is reused, but some heated water is directed to the farm's boilers for preheating, which allows them to work more efficiently.

The cooling tower also employs non-chemical water treatment to prevent outbreaks of Legionnaires' disease and other bacteria. Albion's UV light system, similar to what is used for drinking water, was installed in both the existing and new cooling towers, allowing for non-chemical disinfection. The interior of many cooling towers are lined with PVC fill packs, which can operate under temperatures as high as 55°C. Given the high temperature of distillation water (60°C or more), PVC won't do. As a result, Albion lined Malshanger Farm's cooling tower with polypropylene fill packs that can tolerate water as hot as 80°C. Albion's design compensated for polypropylene's loss of thermal performance.

### Natural/Synthetic Cost and Sensory Factors

Customers continue to push for cost optimization in mint formulations, says David Beaver, laboratory manager/flavor chemist at Norwest Ingredients, LLC. Given supply strains and overall costs of natural ingredient production, mint oil can

often be too expensive for customer briefs. Many may not wish to pay for pure oils. As a result, Beaver and his team maintain a library of pure American mint oils against which to compare natural and synthetic alternatives, ensuring the full, robust character is present.

If the droughts in the Northwest persist, further cost issues could arise—especially as slack is being drawn out of the system. Some farmers may have to harvest early to keep menthofuran levels within specifications, says Beaver. That could hurt oil quality and price simultaneously. That said, the Columbia Basin, compared to the Yakima Valley, has ample water. And the overall quality of products has been good, Beaver notes.

Formulators can provide the whole spectrum of mint tonalities for customers. Beaver says most customers want natural, and may be open to 80/20 blends of American/Indian mint. However, in the pursuit of optimized pricing, some customers are willing to accommodate natural/artificial blends.

Emerging market customers are of course looking to have the lowest possible price for flavor products, sometimes cheaper than standard market rates. In such an environment, says Beaver, adulteration can be rampant. He notes that some targets that have been received are mixes of synthetics and naturals, despite claims of all-natural. While synthetic alternatives to naturals can lack character and richness, often the purchasing department will win the day.



*At Malshanger Farm in Hampshire, England, Sir Michael Colman produces Black Mitcham mint for Summerdown mint products (tea, chocolates and personal care).*

## Further Reading

Read more about the unique properties of Black Mitcham mint in "The Phoenix Arises," pages 16–18 of the August 2014 edition of *P&F*; [www.PerfumerFlavorist.com/magazine/pastissues/](http://www.PerfumerFlavorist.com/magazine/pastissues/).





Summerdown uses Black Mitcham mint in its range of personal care products.

### Expanding Applications and Tonalities

Mint ingredients are used in many applications today, says Brett Dumph, Lebermuth's vice president of business development. While oral care and confectionery segments have dominated mint applications, the tonality is found in an increasing number of personal care products, including infused waters, shampoos, bath gels, body washes, lip balms, deodorants and beauty masks.

Mint doesn't have to be minty, Dumph says, noting that mint is turning up in unique fantasy fragrances, for instance paired with aloe or tea tree oil, or as a nuance/contributing note that twists a main profile. Mint can add earthy, airy and breezy qualities to scents, which are very subtle, delicate, and almost oceanic and ozonic. They can also bring bottom notes up to the top in formulations.

Formulators can create an array of differentiating mint products using combinations of mints, or by pairing mint with profiles such as grapefruit, which can boost the overall sensory character. In this way, mint can also be used to create sensory profiles that are "similar but unique," delivering familiarity to consumers—with a little twist.

Dumph explains that formulators and product developers can differentiate their products via overall menthol content to communicate efficacy with the chemical's signature "tingle." Formulators and brands are also experimenting with Indian peppermint profiles, says Dumph, or more complex mint notes.

When it comes to ethical mint products, Dumph says that "consumers are voting with their dollars." Lebermuth has a fair trade business in India, focused on organic peppermint, spearmint, commint and menthol crystals. These projects can support efforts to provide growing communities with clean water initiatives, education, medical access and other basic needs.

While such efforts are in the early stages, Dumph believes more product developers will embrace fair trade mint products. He explains that consumers care about where products come from, are aware of ingredients, and care about the farmers and communities involved in the production of natural products. In addition, fair trade operations can support transparency initiatives, providing a marketing story that is highly valuable compared to the cost of the initiative.

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