From Biofuel to Non-GMO Flavor & Fragrance Ingredients

How the clean technology sector can relieve natural ingredient supply challenges

Colby Underwood, Blue Marble Biomaterials

Consumers are becoming increasingly aware of and concerned about the use of artificial ingredients in the products they and their families use. Cosmetic and food manufacturing companies are responding to this by accelerating the switch to natural ingredients. Despite strong findings that synthetic ingredients are perfectly safe, consumers are unrelenting in their ever-increasing attention to ingredient lists.[1] In early March, Nestlé announced that it had eliminated artificial flavors, colors, and preservatives in the United Kingdom in response to consumer demands for natural ingredients[a]. Even as natural ingredient demands have grown, sourcing these materials has only become more challenging to manufacturers. Higher production costs, volatile feedstock price and supply, and quality control make natural materials a fickle link in the supply chain.

A look into the pharmaceutical market for natural ingredients can provide some insight on the challenges faced in the food, flavoring and fragrance markets. A CBI Market Survey identifies two predominant influences on the prices of natural ingredients: quality and economics[b]. The economic factors include the cost of production and the existence of synthetic substitutes. Quality factors include the point of origin, crop quality, methods of extraction, concentration of the active ingredients and purity. Natural materials from developing countries offer favorable economic factors, but this decision must be balanced with the loss of control over quality and transparency in ingredient sourcing. Natural materials must be grown and processed properly in order to avoid contamination from pesticides or concentration of toxic botanical constituents.

The increased demand for natural ingredients is squeezing the market for naturals, and making the balance of the quality and economic factors more difficult for manufacturers to achieve. This market scenario has provided room for growth among natural ingredient suppliers. New flavoring, personal care ingredients and fragrance suppliers are appearing with new and innovative solutions to traditional natural ingredient supply challenges.

Renewable energy and fuel companies have discovered that fermentation technology can produce natural flavors and fragrances in addition to foundational products such as methane and liquid fuels. Companies are taking a few different paths to diversify their portfolios, including the use of genetically modified yeasts, bacteria, or enzymes that feed on specific sugars from corn, sugar cane, or other carbohydrate-rich plant material to produce natural ingredients. A different path, such as that used by Blue Marble Biomaterials and other companies, uses non-genetically modified bacteria and a wide variety of agricultural byproducts such as beer mash, coffee grounds and wood chips to produce natural ingredients. Whatever path individual companies take, this movement is poised to bring more natural ingredient price and supply stability

[a] Nestlé Confectionery UK removes all artificial colors, flavors and preservatives from its products, March 2, 2012; *www.nestle.co.uk/media/pressreleases/Pages/allpressreleases.aspx*

[b] CBI Market Survey: "The Market for Natural Ingredients for Pharmaceuticals in the EU. CBI Market Information Database"; *www.cbi.eu*

to the flavor and fragrance industry, as this type of production does not rely on agricultural crops or petroleum prices. Furthermore, natural materials that face complications due to kosher or vegan dietary restrictions can be replaced with drop-in replacements produced from these plant-based processes. The price and availability of natural materials such as esters, terpenes, thioesters and carboxylic acids will hopefully become less fickle thanks to these innovations.

That clean technology companies previously focused solely on fuel or energy production are now pursuing natural flavoring and fragrance ingredients is a logical shift in the economics of the industry. Petroleum companies have diversified product portfolios with both high-value and low-value products. These companies have learned to focus on the highest value products; in the mid to late 1800s, refiners dumped gasoline in rivers because it was not valuable in the pre-automobile economy.[2] Renewable fuel and energy, while somewhat valuable, are still low-margin, high-volume products, which are not good revenue generators for young companies. Clean technology companies are just starting to diversify their product portfolios and creating high-value products as an economic survival strategy. Natural ingredients from plant-based feedstocks are high-value, low-volume products that can be used to generate revenue. These newcomers are changing the economics of how natural ingredients are produced through innovative technology, new feedstock sources and diverse product portfolios; it's an approach that helps the market and the environment.

Address correspondence to Colby Underwood, chief business officer, Blue Marble Biomaterials, #110, 505 Broadway East, Seattle, WA 98102; colby.underwood@bluemarblebio.com.

References

1. S Tanner, Viewpoint: Misconceptions Surrounding the Fragrance Industry, *Perfum Flavor*, 33(1), 22–23 (2008)
2. R Chernow, *Titan: The Life of John D Rockefeller*, Random House, New York (1998)