

IFEAT Preview: More Than a Slogan—Sustainability in F&F

“The one thing I thought throughout my career is that chemistry has a very bad reputation,” says Gennady Kolomeyer, director of R&D at Renessenz, who will discuss sustainability and “greenness” from a chemist’s perspective as part of the annual meeting of the International Federation of Essential Oils and Aroma Trades in San Francisco, running September 29 to October 3 (www.ifeat.org). Kolomeyer, whose career began in 1977, adds, “When I first started working, there were a lot of big environmental problems, disasters, [regulators] looking into materials. Chemistry was something that people were looking at as a source of the next bad news.”

He found it encouraging, then, to see the chemical industry moving toward green and sustainable chemistry. As defined by the U.S. Environmental Protection Agency, green chemistry is: “the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances.” According to a 2011 Pike Research report, green chemistry could save industry \$65.5 billion by 2020.^a While it took several years to trickle down throughout organizations, Kolomeyer says today green chemistry is “not just a slogan.”

“It has to be every chemist and person in the company, it should come down from being an abstract concept to a personal philosophy,” he says. “You have to go through certain steps so that your next process meets all these concepts.” Too often, he says, publications may declare processes “green” without properly evaluating them, leading to “infinite shades of green.”

“It is important to give some quantification [to processes], give it some numbers, to be sure you’re using the right tools when building processes,” says Kolomeyer. “It allows you to vet green/clean chemistry ... and make sure it’s really clean.”

Kolomeyer employs atom economy assessments in his own work to assess the efficiency of a chemical process as measured by the number of atoms involved. He also measures mass index to review the environmental impact of processes.

“In developing new processes you look at the makeup of your compound and use a sustainable source when possible,” says Kolomeyer, adding, “it’s not always possible.”

“‘Sustainable’ can be measured differently,” Kolomeyer adds. “How much sustainable or petrochemical carbon comes in and goes out? What is the percentage of petrochemically derived and sustainable carbon in the final product?”

He also stresses that the chemist is not alone in the green chemistry process. Procurement professionals and every other individuals in the corporate structure must embody green principles.

^awww.navigantresearch.com/newsroom/green-chemicals-will-save-industry-65-5-billion-by-2020

“The market will drive it,” Kolomeyer concludes. “The consumer goods companies are doing it. If they push their suppliers hard enough, we will not have much of a choice but to focus our efforts to make our new aroma chemicals more sustainable. It’s a two-way street. The consumer and customer will make the push.”

Scott May, vice president of global innovation at Givaudan Flavors and a presenter at the forthcoming IFEAT conference, sees a similar push-pull between consumer demand and industry logistics: “There is a higher and higher demand for naturals, but at the same time, naturals are getting harder and harder to get, and costlier. We definitely see a trend of the industry moving to more natural flavors from a regulatory standpoint [as well], which is going to drive the need for more natural ingredients.” (A recent MarketsandMarkets study estimated that the global natural flavor market would expand from revenue of \$3.5 billion in 2011 to \$5.1 billion in 2017.)^b “If you look at the cost associated with those [ingredients]—especially the natural specialties grown specifically for the F&F industry—they have tracked at a higher increase in cost compared to natural commodity-type products.”

These costs are driven in part by limited arable land and water resources in growing regions, in addition to growers’ interest in more lucrative non-F&F crops.

This dynamic creates significant strain on supply costs when customers demand these natural solutions but are reluctant to pay a premium. At the same time, the development process of a novel natural or synthetic material can last three to five years and involve prohibitively costly toxicological testing. As a result, says May, unless a material is going to be a “blockbuster,” the risk for new material development is too high to justify development for the F&F market.

“That means we have to find different ways to get at these materials than our traditional discovery and extraction process,” May explains. “It’s better to be able to use foodstuffs, things that are already very well known—starting from glucose or corn or anything that is readily available and cost-effective, and then doing some sort of bioconversion of that into the material you’re looking for.”

Of course, the issue with creating a “globally relevant” material via bioconversion is the need to find non-genetically modified organism (GMO) substrates, May explains. Despite that GMO products have no known ill health effects, there is significant consumer and regulatory backlash against them. However, finding non-GMO substrates, May says, can be an easier and more cost-effective solution compared to sourcing some traditional F&F specialties.

“To me, biotechnology is an opportunity to revolutionize the flavor industry, probably more so than anything we’ve seen in the last couple hundred years,” May concludes. “You’re talking about being able to move in the direction of taking basic feedstocks and using synthetic biology to manipulate that into the material that you desire. You’re not reliant on the crop cycle, the farmers switching out to other crops, or traders hoarding products and [artificially increasing] prices. We’ll have much more control over that.”

^bwww.marketsandmarkets.com

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