Threats and Opportunities for the Industry

Welcome address underscores globalization of industry and the challenges ahead

In opening the 2008 conference of the International Federation of Essential Oil and Aroma Trades in Montreal, Canada, organizing committee chair Kim Bleimann (Berjé) announced that this year's gathering boasted 590 delegates from 42 countries. Bleimann remarked on the great number of participants from India and China—representing nearly 20% of total attendance—which he felt underscored the shifting of business to these areas of the world.

Kim Bleimann (Berje), chairman of the conference organizing committee

"This past year has been extremely turbulent and certainly exciting," he said. "Not since 1973–1974 have we seen such shortages and wildly inflationary price increases on essential oils and aroma chemicals. There have been several conflicting and contributing factors coming into this mess, the first one being the Olympics, disrupting supply from China, which has focused for many of us the incredible reliance we have had on China as a source of supply. [Second,] the cost of fuel has impacted fertilizer, transportation and production and distillation costs, which are more important than we sometimes realize." Bleimann went on to note that the global credit crunch could affect the industry in as yet unforeseen ways, in addition to impacts from REACH, air freshener legislation in California and environmental concerns across the globe. "We worry daily for the future of essential oils if we fail to be proactive in fighting these myriad threats."

In this spirit of upheaval and opportunity, Bleimann invited the delegates to take the conference as an opportunity to learn, raise questions and foster discussion.

A view from the 2008 IFEAT dinner

IFEAT 2009 Shanghai, China

"The Industry and Market in China" is the theme of the 2009 IFEAT gathering in Shanghai. Held at the Pudong Shangri-La, the event will address global market and technical developments in essential oils and aroma chemicals, flavor and fragrance industry and market trends in China and other regional players, and legislative issues, particularly REACH implementation.

Details and contact information here: ifeat.org.

More images IFEAT 2008 online at *perfumerflavorist.com/photos*.

Flavor and Fragrance Trends and Supply Chain Challenges

Macro trends in the North American flavor market, global fragrance markets, worldwide supply issues and the future of naturals in perfumery

Flavor Industry in Flux

Gladys Gabriel, global director of purchasing at IFF, opened the first day of IFEAT 2008 with a discussion of the North American flavor industry. The average American, she noted, spends more than he or she makes, and an estimated 43% of US consumers spend $1.22 for every $1.00 they earn. In addition, there has been an easing of gross domestic product after several years of a robust economy. The results are splashed across every newspaper in the world. While this drop is in line with what other countries such as China are facing, the psychological toll is clear.

Meanwhile, the economic boom of recent years has increased competition for food and biofuel commodities such as corn and soybeans, which have recently hit record highs. (This theme was repeated by many of the event's speakers.) As a result, farmers are abandoning essential oil crops because they pay no better than commodities, and certainly don't enjoy the vast subsidies that biofuel crops enjoy. The cost of fuel has risen in tandem with the consolidation and downsizing of companies. Unemployment is up, purchasing power is down. Gabriel noted that 70% of US consumers are now combining shopping trips to save money.


Gladys Gabriel, IFF

"Consumers are watching, listening," said Gabriel. "You have a huge, huge challenge for the American consumer to keep up with the economy."

Through it all, she noted that 2009 would likely see up to 3% growth in the flavor industry, remarking that growth is typically modest but steady. Real growth could be 18 months or even two years away. Meanwhile, she felt fragrances would be more negatively impacted because they are often included in more luxury items.

What's driving the North American consumer? And how will those drivers shape what is happening at the product development level? And how do companies deliver the increasingly technically and organoleptically complex flavor impacts/targets in a tightening economy?

Gabriel's road map included an increased focus on health as the US population ages and begins to eat proactively. "Healthy," she said, could mean all manner of aspects such as naturalness, quality, freshness and minimal processing, all of which present the flavorist with myriad technical hurdles from stability to shelf life to cost.

Nutritional/health formulations present flavor challenges. Gabriel underscored the growing introduction of healthy low-calorie beverages such as vitamin water, natural/healthy gums and confectionery applications, snacks, savory and processed food, and the increased use of functional products. As flavorists well know, not all of these materials taste good; undesirable flavors are often part of the deal.

Meanwhile, there has been a heavy shift on the market toward natural flavors, whatever "natural" is. "There's no consensus," said Gabriel. "What applies in Europe does not apply in North America. And it keeps evolving independently across the world." In some cases, it can take an entire regulatory department to keep track of it all. Gabriel added that, when consumers demand natural, it puts a lot of pressure on the industry to deliver. One emerging tool that could help these formulations is the use of bioconversional products that require minimal processing: enzymes and fermentation.

Even if all parties were to agree on the definition of natural, Gabriel noted, "There are going to be sourcing challenges." The stocks of naturals may well not be big enough to support all brands, she explained, and land for natural flavor materials faces competition from other more lucrative food and biofuel crops, as noted before. Meanwhile, overall land fertility is decreasing. What may be necessary is to develop palettes with flavorists and product developers that allow for steady supply. As these supply bases are developed, it will require close management and strong relationships to ensure uninterrupted supply. Companies do not want to be caught with insufficient materials when a product lands on shelves. "Success comes with its own challenges," she noted.

Ecology, in concert with a desire for all things natural, is another crucial trend. Gabriel underscored consumers' desire to make the best use of our natural resources and sustainable, minimally processed products. On the back end, companies are looking to make their activities, such as processing and extraction, more energy-efficient.

"We are more open to different influences in our

cuisine," said Gabriel, discussing changing taste preferences among consumers. "You have a huge impact from Hispanic and Asian population[s]." In 2005, she said, some 55 million US residents were of Hispanic and/or Asian extraction. By 2050, that figure could reach 170 million. Preferences are bound to shift further, given those demographics. There will be continued pressure to create more authentic ethnic flavors with more sophisticated flavor profiles, which will require novel/patented materials derived from R&D investment. This is a challenge because the cost of capital is rising in this economy. Access to capital is key here, Gabriel said, because without it, R&D support cannot be sufficient, making business unsustainable. "This is where we'll see a lot of pooling of resources, forming [complimentary] alliances."

Economic pressures are keeping people at home and focusing on family. And while they may budget, they still want the best, to have choices, said Gabriel. US consumers became accustomed to the experience of dining out during the boom years, and so they are looking for that same experience, but in the home. Premium chef-prepared style products are highly desired. Products must reflect culinary influences. At many companies, chefs often work with flavorists and product development teams to carry over preparation aspects to flavors.

Gabriel showed the audience some of these concepts in practice. She displayed natural chili-lime-flavored chips that combined the healthy positioning of snacks with ethnic flavors and a more sophisticated palate; beverages touting natural flavors; and cured bacon and pizza positioned as natural.

Supply Chain Challenges: a Multidimensional View

"No longer do we deal in one-on-one relationships or single, simple, linear supply chains," said Patrick Houston, a partner in the operations practice of Booz and Co. "We're in a new normal where volatility is almost the norm."

Today, as supply fragments, companies deal less with a supply chain than they do a network. Up and down the chain, people are trying to grow in new, international and emerging markets. Along the way, people try to adopt practices that best meet their needs, driven by need for more unique and individualized products. Meanwhile, Houston pointed out, growing external concerns such as product safety, sustainability (building green practices into normal work flow) and legislation predominate. The biggest change Houston highlighted was the growing focus of service and risk management in terms of assuredness of supply. It's no longer just about cost. It's about how the supply chain is facilitating growth whether in capacity or new product innovations.

"People are really worried about interruption of supply from their key suppliers," he said. Houston urged attendees to know their supply and demand dynamics, to gather their own insight on the ground. What are the drivers of demand (example of citrus: soft drinks), what's the supply situation? Companies must understand supply from a local-regional level and build their own insights into supply strategies. Understand your markets, he urged. What has changed over time at source? (For instance, the ability of farmers to increase productivity, land availability, etc.)

Houston then touched on establishing cost insights. What are the costs divorced from market/labor volatility, he asked. What is the true cost of production? Understanding these factors can lead to more long-view, collaborative efforts. What are the risk and return requirements for each product? Knowing this can fuel stable financial return, particularly in collaborations. Houston went on to run down the stability management: variables for each region, energy, labor, currency, land, buyer-supplier relationships, natural hazards, currency fluctuations, etc.

Houston envisioned far more collaborative supplier relationships: building capabilities to manage costs and meet product needs, add cost stability, and innovate over time for a mutually beneficial collaboration. He also urged the audience to grow capabilities to meet the needs of the above strategies, meanwhile sharing plans, strategic objectives and identifying opportunities.

"There's as much art as science to doing this," he said, noting that much of this relies on interpreting insights derived from suppliers and other sources along the supply chain.

North American Fragrance Trends

Next, Doreen Bucher, senior director of marketing at Symrise, discussed the global perfume market, which totaled about $20 billion in 2006. For the first time since 1998, fine fragrance growth actually outpaced beauty care worldwide. Seventy percent of the fragrance market results are derived from Western Europe and North America, Bucher noted, but these markets are mature and rather flat. BRIC countries, which includes Brazil, Russia, Indian and China, have been adding growth, as is Eastern Europe (at a rate of 9%), Asia-Pacific and the Middle East. Latin America, meanwhile, grew the most at 13.5%. Travel retail, rebounding after 9/11, totaled 12.5%. Mass market fragrances account for 35% of fine fragrance; prestige accounts for 65%.

Brazil accounts for 21% of the Latin American market, growing at 14%. Japan makes up 21% of Asia-Pacific, but is in decline at a rate of 4% per year. China has been growing at 24% per year, and Singapore at 35% per year. Russia accounts for more than half of the Eastern European fine fragrance market, growing at 8.5%.

Just 10 companies account for more than 80% of global fine fragrance sales, Bucher explained. P&G Prestige, for example, boasts a 14% share. Only 30 brands make up more than three-quarters of the fine fragrance market; 21 are European brands. Other countries such as Brazil launch brands that may climb to these heights. However, each individual country's own brands tend to dominate their domestic top 10.

In 1950 there were 10 new launches, said Bucher. In 2007, there were 479. In 2008, this number is likely to almost double (409 in the first 6 months alone). "Unfortunately, we're not increasing the market that much, we're just increasing the [amount of] fragrance," said Bucher, pointing out flankers and limited edition seasonal/holiday editions.

US fragrance sales are down 3%, in spite of 346 new prestige fragrance launches; men's scents are down nearly 6%. Bucher noted that only 4.9% of men's purchases have been new fragrances, as opposed to 10% the year before. No new launches made it into US women's top 10. If a fragrance can survive for even just three to five years, it's now considered a "classic," Bucher noted. Some new launches did make it into the US men's top 10. Unisex fragrances, meanwhile, tend to do better in niche markets as consumers tend to be more comfortable buying gender-specific scents.

Global feminine olfactive trends, according to Bucher: floral; chypre on the rise since 2000 (United States); oriental on the rise in the United States; fruity growing across regions; edible fruity; chypre-fruity; new greens like *Daisy*; white flower in the United States; in last few years, floral launches have dropped about 10%; growth in orientals/gourmond; sensuous US market; edible notes like vanilla, chocolate and coffee; very minor influence from sustainability in fine fragrance.

Global masculine olfactive trends per Bucher's data: fougere, woody, citrus and aqueous US; new sexy: oriental sensuality—incense and tobacco; maple walnut syrup or coffee; elegance; and masculine florals.

The Future of Naturals in Perfumery

Finally, Chandler Burr, author and *New York Times* scent critic, presented a spirited talk aimed directly at raw material suppliers.

"I think that you—both aroma chemical and naturals suppliers—can and should play a much, much bigger roll in perfume than you do now," he said. "I'll tell you one of the reasons why: I'm bored out of my mind by most perfumes. It is an industry that does not trust the product—the perfume, the juice—at all."

Chandler Burr

Burr noted that the bottle and all the marketing can sell the first bottle of a fragrance, but the second bottle will be sold by the fragrance itself. "Who ever bought a third bottle of perfume because they thought it was pretty?" Burr asked. "By that point they know it, and they either love it and buy it again or go on to the next thing."

"The juice is you," he told the audience.

Complaining that the industry has drowned in marketing, Burr discussed several major fragrance launch events he attended at which the scent itself was minimized or ignored. "There's no story behind these perfumes, whatsoever," he said. "It's all about novelty." The author set the blame on the media for being obsessed with newness over quality. "Novelty is killing the industry. It is cannibalizing everything. It is creating juices that are increasingly … cheap."

Burr mourned the age in which companies would approach fragrance houses and ask for a beautiful and innovative juice that appealed to a very specific kind of man or woman with a target cost of $50/lb for compounding. Today, he said, companies brief with cut-rate rates per pound ($2.75). "You can't make anything for that. They don't trust the juice, they don't trust what they're putting in it."

"Believe it or not, you are the solution," Burr continued, noting that it is important to highlight importance, beauty and creativity of synthetics. "The stories of the raw materials need to replace the marketing garbage." The briefs he's heard have been so overly general and vague as to be meaningless. "How do you replace it? You replace it with synthetics and naturals," he said, adding that the brands have no problem highlighting the use of synthetics in products such as skin creams—so why not fragrances?

"The mentality can be changed," he said. "Hedione, when you add it to a perfume, has the most beautiful effect. It actually doesn't change the scent that much, as it changes the feel. It is like taking a perfume and pouring liquid halogen right into it. The perfume glows, it lights up. It comes alive. [Hedione] is a gorgeous molecule … It has revolutionized perfume and the story can be told." Rather than overwhelm the public, he argued, this sort of knowledge excites people.

"What is the one marketing device that every industry, except the perfume industry, discovered years ago: you take the consumer behind the scenes. You take them into the actual industry." Burr used the example of the launch of the Boeing 787, which has been accompanied by detailed explanations of its construction and the science behind the plane. "The perfume industry needs to figure out the same thing," he concluded.

Meanwhile, he said, "Naturals are wonderful because they involve human beings. Tell the story of the people behind them. Who is growing the products that you guys process and sell? Farmers—people. You've got gypsies in Bulgaria, farmers in Indonesia who are growing this amazing patchouli. You've got women in West Africa growing and processing shea butter … Their stories need to be told."

"The perfume industry is not in great shape," he concluded. He noted that the industry could either continue selling to only its base, which can be swayed by marketing and artifice, or it can connect with smart, conscientious consumers. "You have the stories. You have to tell the stories. That is the way to make perfume not just a better art, but something that is truly part of the world in a way that it's not today."

Macro Trends in the Global Mint Industry

Supply pressures, consumer trends and the opportunity for regeneration

During a session entirely devoted to mint, chairman Brian M. Lawrence (*The Journal of Essential Oil Research*; *P&F* magazine) introduced Ross Sheldon, vice president of R&D at AM Todd, to discuss this key material's role in the flavor and fragrance industry.

Oral care and confectionery industries consume the most mint oils, said Sheldon. These industries have been growing reliably at up to 4% per year. Looking at the supply side, he noted, "The picture is not as good. We have a very volatile market … in regard to supply. We have strong competitive crops—corn, soy and wheat. The growers are looking for equivalent levels of profitability from their farms. Mint must deliver that level of profitability in order to grow and expand."

Confectionery

Brian Lawrence, P&F *magazine,* Journal of Essential Oil Research

Looking at 2003–2007 confectionery growth trends, nearly all categories enjoyed solid growth, said Sheldon. "Globally, the confection market is the second largest consumer product goods market after beer. The product introductions in chewing gum have doubled over the last five years. Mint [including mint, peppermint and spearmint] is the predominant flavor."

"We're talking about all of the mint oil blends, the fusion flavors that are combining, say, fruit products with mint products," Sheldon continued. "This is a very important market direction for the confection industry." His survey comprised more than 1,500 brands. Peppermint, spearmint and menthol represented a market share of more than 50% of all those brands.

Supply Considerations

In the period since 1997, mint supplies have dropped by nearly half. Mint-flavored products increased by 27% during this same time. Indian-derived oil supplies during that time doubled to ~$1,500 metric tons by 2005. Rather than being a dire supply lag, Sheldon argued, the supply merely realigned with demand. Since October 2007, prices for North American peppermint (nearly double) and spearmint (more than 40%) oil have seen drastic increases. This is partially a result of rising farm input costs (such as fertilizers) and falling production. Farmers' revenue expectations have been raised by competing crops—corn, wheat and soy. Thirty percent of US farmland alone is consumed by biofuels, brought on by government subsidies. Meanwhile, there is growing demand for crops such as corn as many countries move to a protein-based diet. "We have to be very close to our growers and make sure they're protected from a farm-level profitability situation," Sheldon stressed. Research is well underway to support sustainability, he said, including new cultivars that feature disease resistance. There are also efforts to improve distillation efficiencies—most crucially, improved yields. In addition, research in new cultivars works on both a GMO and non-GMO basis.

As to the future? "There are new flavor profiles in the mint area that are being developed," Sheldon concluded.

See our mint story on *Page 30*.

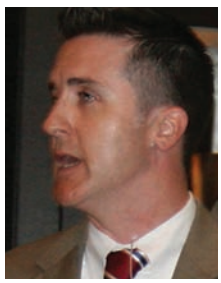
For Citrus, the Glass is Half Full, Half Empty

From natural disasters to agricultural residues, IFEAT's citrus experts discuss the state of the industry

Hugo Bovill of Treatt presented a fascinating, in-depth panel of citrus experts at this year's event. The overarching news was mixed: there are real threats to citrus production around the world, but solutions exist to meet demand and stabilize production. Below, are just a few of the highlights of this session.

Orange

"We're all dealing with the cost of doing business, whether you're a farmer, a processor, a beverage company or a consumer," said Mark Walsh, business development director, Citrus & Allied Products, during comments at this year's IFEAT conference.


Mark Walsh, Firmenich

Sometimes Mother Nature has contributed to these costs, particularly in Florida. While there were healthy orange crops in the 1997–1998 and 2003–2004 seasons, said Walsh, 2004 alone brought Hurricane Charley and Hurricane Francis, the latter of which hit the grapefruit growing region the hardest. Then Hurricane Gene sparked tornadoes and heavy rain; citrus fruit was blown to the ground and groves flooded. Production has been cut by these and other disasters. US citrus acreage has declined. Meanwhile, Brazilian orange growers have increased production under long-term contracts that offer in some cases more than double the prices seen as recently as 2000.

The Florida storms also spread crop disease, said Walsh, including canker, which is a bacteria transmitted by windblown rain, tainted farm equipment and the transportation of diseased trees. The sad irony is that canker had been nearly eradicated in Florida until the 2004 storms. In addition to this, greening, a bacteria that originated in Asia, presents what Walsh called a "potentially greater threat than hurricanes." (For more details on greening, visit *http://edis.ifas.ufl.edu/PP133.*)

Walsh cited projections that, moving forward, the industry would reach 140–170 million boxes of oranges—barring any catastrophic freeze or hurricane. Whatever the production, there has been a lasting change in the landscape of processors. This presents an essence oil availability issue: if there is a crop of, say, 240 million boxes, typically in an average year about 85 million go straight to making not-from-concentrate. In a year in which the growers only produce 140 million boxes, it is easy to see that the availability of essential oil is limited.

In 2000, there were about 37 citrus processers in Florida, Walsh explained, processing 220 million boxes. Some companies, however, were unable to execute operational efficiencies and achieve profitability. The result is that the industry is down to just 15 citrus processors. Some of the companies that left the industry were simply too small to maintain operations, but even bigger players exited the unfavorable marketplace, as well.

Real estate has also shaped US orange production. As property prices increased in recent years, younger farmers began to see more value in the land than the citrus growing on it. Grove values are roughly $1,000/acre, while developers may offer $50,000 or $70,000/acre. Meanwhile, new plantings are unproductive for several years. The attitude, as Walsh put it, was: "Why should we replant citrus when we can just transplant a 'northerner' from Canada, New York or Michigan?" The younger generation of farmers has proven less apt to be patient with farming, favoring "show me the money now" attitudes.

Finally, Walsh raised the specter of agrichemical residues (AR): insecticide, herbicide and fungicide residually present in the oil. "We all know how they get there," said Walsh. "Growers are trying to maintain their investment, maintain their crops." Sourcing organic is currently an unfeasible solution, he added, given current volumes and prices. Bottom line, the initiative for *not* spraying just isn't there: it's the juice that pays the bills, not the oil. "The growers are in the business to make sugar from fruit," Walsh added.

The beverage and flavor industries are unlikely to change this scenario. Coupled with this, contemporary analytical equipment reveals residues at ever-lower levels. Today's instruments are seeing things that couldn't be seen before. But that doesn't necessarily mean that the industry will have to chase "absolute zero."

"At the end of the day, common sense will prevail," said Walsh. "I don't want to negate the health or safety issues associated with this, but when you look at the citrus oil that has parts-per-million [or] sub-parts-per-million levels

of these agricultural residues that are used in flavors at a certain percentage and then that flavor is used at a certain percentage in a beverage, we need to step back and try to apply some sound science and common sense to this problem."

Juice is the primary product of oranges, Walsh repeated, not the oil. ARs that co-elute during distillation present the industry with a problem. Those components cannot just be stripped out because there is the risk of taking away oxegenates and other valuable components. The remaining material just won't feel right. Walsh lamented the prohibitive expense of addressing the myriad classes of ARs. But, he added, "This isn't going away. We're going to have to evolve."

The regulatory and environmental compliance issues elsewhere present different challenges. Questions of air quality and volatile organic compounds (VOCs) persist. "This is not just an issue for North America," said Walsh. "It will have a far-reaching impact. Many people will look at what happens in the United States and apply those regulations. We're already seeing it in Europe."

Meanwhile, there is rampant misinformation; citrus oils are being lumped in with petroleum-based products or other potentially harmful materials. The industry Walsh stressed, has not had a voice. He encouraged attendees to inquire about the Florida Citrus Processers Association's Renewable Citrus Products Association, which promotes citrus oil as a natural, sustainable, renewable material. (For more information, visit *fcplanet.org* or contact Jon Leonard; leonard@floridachemical.com.) The group has worked to develop environmental impact/lifecycle analysis on citrus materials and is intent on producing solid data to take to regulators to make the case that citrus is different.

Anything less could be crippling to the industry, Walsh said. Citrus continues its historic popularity in foods, beverages, confectionery and fragrance, and is finding ever-broadening use in savory applications, natural cleansers (green solvent), insect repellent applications, degreasers and even (in Japan) tires.

Evolution of the Lemon Industry in the 21st Century

Suzy Nolan, general manager, Lionel Hitchen USA (**see Q&A: Lemon Oil in Crisis**), provided a long view of the lemon industry, its challenges and resilience.

Beginning with a period she referred to as the "Growth Phase" (1995–2000), Nolan presented data showing that 3 million metric tons of lemons were being produced each year. Of that, 40% went to the process industry, while 60% went to the fresh market (about the same ratio holds true today). Thus, 1.23 million metric tons were actually processed, resulting in 5,200 metric tons of lemon oil. One ton of processed lemons yields 55–60 kilos of lemon juice and 3.5–5.5 kilos of lemon oil, depending on the equipment used, Nolan noted. The main players during this period (which remain relatively unchanged to this day) included Argentina (top producer), Italy, Spain, Turkey* and the United States. Other players are and were involved, but to a limited extent. During this time, the crop grew overall, resulting in falling prices.

In the "Challenge Phase" (2000–2004), Nolan said that production levels stabilized and the industry enjoyed

IFEAT citrus panel: Norberto Rodriguez, Frutech International; Mark Walsh, Firmenich; Hugo Bovill, Treatt; Suzy Nolan, Lionel Hitchen; Richard Pisano Jr., Citrus and Allied

record low prices for oil, juice and peel. The demand for fresh fruit also fell, so growers were not getting a good return all around. In fact, she said, the price growers got from processors didn't even cover transportation costs. As a result, groves were neglected, lowering the yield-per-hectare. Growers also did not replant to make up for diseased or aged trees. In some cases, they replaced lemon trees with other crops such as sugar cane and soy. Simultaneously, the fresh markets grew and oil customers entered into long-term contracts, taking product off the market.

Finally, the "Period of Adjustment" (2005–Present) witnessed increased fuel and currency issues and dramatic price increases. In 2007, 4.1 million metric tons of lemons—processed and fresh—were produced. Of these, 45% were processed, with 55% heading to the fresh market. By this time, Brazil, Mexico and South Africa had become significant players in the market. Even so, Argentina dwarfs those countries; some single Argentine factories can out-process whole countries in a single year. During this period, Argentina alone processed 1.86 million metric tons of lemons, bearing 8,900 metric tons of lemon oil.

According to the latest available figures, Nolan said, the southern hemisphere's influence has grown to account for 60% of processed lemons, versus 40% in 1995. Presently, Argentinean oil production is down about 32%; Brazil had a good crop recently; Italy had a "disastrous" crop last year; Spain had a big drop on the processing side; the United States is down 30%. In total, processed lemons were down 37% in the last 12 months. Moving forward, Nolan has seen fresh demand growing. More development is imminent in Argentina, particularly in vastly expensive effluent systems, which will take time. Meanwhile, the emerging markets of India and China remain a wild card.

Nolan echoed Walsh's earlier comments regarding ARs, highlighting the conflicting priorities of the fresh and processed markets. The result is that getting clean lemon oil in some regions can be difficult. Argentina, she noted, has been the leader in AR reduction over time in part by separating fruit before packing chemicals are applied. Yet some growers—many of them under-informed industry neophytes—have continued to employ unacceptable chemicals.

*One hundred percent of Turkey's lemon crop goes to the fresh market. The country's lemons are reportedly irregularly shaped and do not perform well in conventional processing equipment. Only by implementing a more easily processed variety could the country become a serious player.

"We need to be diligent in testing and supporting AR reduction," Nolan concluded.

Richard Pisano Jr., Citrus and Allied Essences

Lime Oil in Mexico

Richard Pisano Jr., president of Citrus and Allied Essences Ltd., presented a lively talk focused on key lime (West Indian lime) production in Mexico. In recent years, he noted, good care has increased per-hectare production in Mexico; 40 tons per hectare is possible if groves are well-tended. Key lime groves are often processed by small family owned companies in Mexico, which makes it very different from the giant operations involved in producing other citrus oils. It also makes hard numbers tough to come by.

Pisano presented estimates that total production of distilled lime oil estimated at 7,000 180-kilo drums. Production of full-pressed key lime oil is around 2,500 drums. (Persian: 1,500 drums of expressed oil.) Mexico is responsible for about 75–80% total oil production. Peru contributes 20–25%.

In the last 10 years, the number of key lime oil producers has fallen by more than half, Pisano said. Small producers could not weather periods of low prices. Meanwhile, fresh lime demand has created a shortage for processers. Prices have gone up. However, said Pisano, a good understanding among producers and processers has been established, and a rational, predictive balance struck.

Q&A: Lemon Oil in Crisis

Suzy Nolan is the general manager of Lionel Hitchen USA; P&F *magazine asked for her take on the lemon oil crisis and the prospects for future price stability.*

P&F: Can you please provide some background on the annual tonnage for lemon oil and usage trends?

Nolan: The annual tonnage of lemon oil produced globally should be around 8,500 mt. This excludes 2008, a year [in which] there will be an estimated 35–40% shortfall. The usage of lemon oil is growing. Lemon oil is used in the manufacture of flavors, fragrance and beverages. The population is growing, so the volume of these products is growing as well. In soft drinks alone, the volume is predicted to grow 9% by 2012. There was a time period between 1995 and 2000 when global lemon cultivation grew by 40–50%. This was followed by record low prices for oil. During the years of record low prices, the usage also increased due to pricing.

The future prospects for price/supply stability depend a lot on the weather. In 2008, the weather drastically affected the crops in every major growing region. If we were to have a year where all regions have a "normal" crop, supply and demand might be fairly close to balanced. Unfortunately, with global warming and earth changes, no one is sure what to expect for the future.

P&F: Can you discuss the changes and declines in growing regions?

Nolan: During the growth period described above, Argentina was where most of the growth occurred. The European Union and the United States have either remained the same or had declines in production. The reasons are many. First, the prices were so low that they could not harvest the fruit, process it into oil and make a profit. Second, the land is quite valuable in the western countries and under pressure from development. Then, once the prices went so low, there was reason to expand groves.

P&F: What has spurred the fluctuations in supply and demand?

Nolan: I think that the demand has been growing steadily. During 2000–2003, there was an oversupply due to the tremendous growth during the previous years. It seems that the demand has now caught up with that growth.

P&F: What is the outlook for organics in this sector?

Nolan: Organic lemon oil and lemon juice are definitely in demand. There has been significant investment in Argentina and also in Italy for organic lemon products. In the short term, the demand could be affected by the economy, but the long-term outlook is good.

P&F: Can you discuss issues regarding pesticide residues and any other regulatory concerns that might affect the market?

Nolan: In general, all of the producing countries have been focused on reducing agricultural residues. Argentina leads the way in terms of reliance on chemicals and ability to reduce the levels. Other countries have a way to go, but I believe they are aware that the market is demanding ever cleaner oil each year.

REACH: Is the Industry Ready?

As the preregistration stage comes to a close, the real work begins

"REACH is already here," said Jo Lloyd, director of REACHReady, during comments delivered to IFEAT delegates. She went on to discuss the preregistration stage of REACH, which was then drawing to a close and which was aimed at determining 1) how many and what type of materials are coming into Europe and 2) what information burdens manufacturers and importers of chemicals and natural complex substances (essential oils) might be able to share in terms of overlapping materials (**see EFEO NCS Update**). Successful preregistration, she added, allows companies to delay full registration, depending upon tonnage, until 2010, 2013 or 2018. In addition, those registering must determine how customers are using the materials supplied (end use).

The process of engaging REACH, Lloyd noted, involves two key steps. First, companies must determine their status under the law—manufacturer, importer, only representative (appointed by a non-EU member) or end user. She urged end users, which do not need to register, to ensure that their suppliers are prepared in order to maintain a steady supply stream. Next, companies that fall under REACH must create substance portfolios. In nearly all cases, these materials must have an EINECS. Materials that have food-only applications do not need to be registered or preregistered. New materials that have yet to receive an EINECS designation must go straight into registration. Any materials added by manufacturers and importers should be registered as soon as they are added to one's portfolio, she added. It is important to note that companies do not have to register every material they preregister—it merely allows one the opportunity to register that material on the delayed timetable if so desired. Preregistration also allows companies to see and connect with other companies that have preregistered the same material, allowing a sharing of the burden. (See Cristina Arregui's remarks below.) "You then get into the complex business of sharing information, data and putting together a joint registration dossier," said Lloyd. What makes the coordination difficult is that REACH provides no framework for this process. Discussions moving forward will involve what data to include and how the financial burden should be divided.

This is where the real work begins.

Cristina Arregui, REACH manager of the European Flavour & Fragrance Association (EFFA), spoke to this and other points. Once companies have preregistered, she explained, they enter a Substance Information Exchange Forum (SIEF).

"REACH tells us what to do, but not how to do it," she warned. Companies that neglect to share data can be fined in some cases. What makes the undertaking so daunting, however, is that the legislation does not specify which member of the SIEF should submit the subsequent joint registration. Arregui's organization is working with companies to make determinations, she explained. There are only a handful of reasons the REACH agency will accept for companies to opt out of joint registration (such as protection of intellectual property). However, even with an exemption, companies will face a higher registration fee and more scrutiny during the evaluation phase. The fact is that REACH does not organize or specify how SIEFs are to be run, nor does it provide any concrete guidelines for shared compensation. For this reason, she concluded, EFFA has backed the concept of consortia, involving contracts that lay out all parties' obligations.

IFEAT REACH panel: Hans van Bergen, EFEO; Colin Ringleib, chairman, IFEAT executive committee; Jo Lloyd, REACHReady; Cristina Arregui, EFFA; Anne Marie Api, RIFM

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EFEO NCS Update

The European Federation of Essential Oils has announced an update on its grouping of natural complex substances (NCS) for REACH registration. EFEO has identified about 150 NCS that will have to be registered as they are produced or imported at a rate of at least 1 ton/year—or will in coming years. According to the organization's announcement:

> EFEO has consolidated the 150 NCSs into 20 NCS-Groups, of which the constituents are similar in chemical characteristics. EFEO will initiate per NCS-Group a consortium for companies to prepare the registrations. … Groups of companies who represent an NCS-Group can request to start their consortium earlier than scheduled. … A registration of NCSs can be based on data obtained for the NCS as such or by read-across from data available for the constituents of the NCS. Constituents are often also fragrance substances, which will be registered. [EFFA] has initiated consortia to prepare their registrations. The EFEO and EFFA consortia should exchange data for the evaluation of NCSs to minimize additional testing as described in *The Registration for REACH of Natural Complex Substances used as Fragrance Ingredients*, which is a protocol developed by both EFEO and EFFA.

EFEO has so far formed four operational consortia: citrus (sweet and bitter orange, lemon, lime, grapefruit, mandarin and tangerine), mint (cornmint and peppermint), safrol-containing NCS (nutmeg and cinnamon leaf) and vetivert. Of these, they have compiled constituent data on about 120.