The Truth About Chemophobia

Is the flavor industry at war and is social media the new battleground?

Steve Pringle, Ph.D., Global VP Sales & Marketing, ACSI Inc., with Gemma Craven, VP Strategic Accounts, Spredfast

"To be prepared for war is one of the most effectual means of preserving peace."

—George Washington

This quote, from George Washington's first State of the Union address, seems somewhat appropriate given the number of anti-flavor articles and media stories which have surfaced in recent months. Is the flavor industry really under attack, or are there just a small number of loud voices out there using the right media to create a disproportionate amount of noise?

Looking at these articles, there seems to have been a rise in frequency, nature and the vociferous rhetoric being used. There also appears to have been a shift from general chemophobia in the food industry as a whole. More and more of what is published online about the chemicals in our food specifically targets flavors and the flavor industry. Much of this, however, is written by mostly well-intentioned, but ultimately ill-informed, bloggers and writers with little or no scientific background or credentials which ends up spreading an inaccurate message to consumers.

The Rise of Chemophobia

Chemophobia is essentially an irrational aversion or fear of chemicals and chemistry. When applied to the food and flavor industries, this often equates to a fear or mistrust of the synthetic chemicals found in the food which we eat. The word "chemical" appears to have become a dirty word, despite everything we see and touch every day being made from chemicals.

An article published by Dartmouth College Professor Gordon Gribble in 2013 outlines potential reasons for the cause and rise of chemophobia.[1] It also explains the concept that it is not the chemical which is toxic but rather the "dose that makes the poison," citing numerous cases where humans have died from consumption of sodium chloride, caffeine and even water.

The food we eat on a daily basis contains naturally occurring compounds, including mycotoxins, which can and do cause death in humans. Additionally, there are naturally occurring chemicals have been found to cause cancer in rodents when consumed in large amounts; if these materials had been synthesized in a lab and added to foods rather than created by nature, then it is entirely possible that their addition to foods or flavors would be banned.

This point has been excellently conveyed in the American Council on Science and Heath article "Enjoy your Holiday Dinner—Chemicals and All."[a] In this article, we can see that there are a number of flavor chemicals classified as carcinogens and mutagens, which occur naturally in the food we eat (**T1**). These articles, and numerous others, point out that everything is made of chemicals, and rather than focus on "chemicals," we should be focusing on the pathogens which hospitalize many thousands each year. Additionally, we need to understand and think about dosage levels if we wish to talk about the toxicity of a chemical rather than the chemical itself.

Growing Media Spotlight

It is this obsession with the chemical itself which is fast becoming the ammunition in the war being waged on the flavor industry. Articles such as those from the Eat Well Group, Gaiam Life[b], television segments on shows like Dr. Oz and author Mark Schatzker's "The Dorito Effect" all claim that artificial flavors are linked to obesity.[c,d,e]

All of these reports give a biased view on food and flavor ingredients without any scientific understanding of the subject upon which they are reporting, and in the case of Dr. Oz reach a large and impressionable audience. Reports such as those by the Center for Public Integrity, which was picked up and promoted by a number of online outlets such as Time.com, MSN.com and ManufacturingNews.com, while offering a slightly more balanced view, still fail to cover the pertinent points and continue to drive public opinion towards the Orwellian-like mantra, "chemicals bad, natural good."[f] This message is continually pushed by websites such as NaturalNews.com using pseudoscientific arguments to reinforce sweepingly inaccurate statements.[g]

Worryingly, these articles are gaining credence in mainstream media. The Leonard Lopate Show on New York City's public radio station, WNYC, recently interviewed the author of the Center for Public Integrity article without including a rebuttal expert.[h] Public radio's Marketplace nationally syndicated radio show also produced features on natural flavors, giving a

[a] *http://acsh.org/2014/11/acsh-holiday-dinner-menu/*

[b] Gaiam Life (@Gaiam) has about 64,400 followers on Twitter as of press time. To compare, *Perfumer & Flavorist* (@PandFMagazine) has 1,214 and the Flavor and Extract Manufacturers Association (FEMA), through its @FlavorFacts handle, has 351.

[c] *www.ewg.org/foodscores/content/natural-vs-artificial-flavors*

[d] *http://life.gaiam.com/article/10-worst-food-additives-where-they-lurk*

[e] *www.wellbuzz.com/dr-oz-diet/dr-oz-are-artificial-flavors-leading-to-obesity-in-america-today/*

[f] *www.publicintegrity.org/2015/06/09/17465/food-flavor-safety-system-black-box*

[g] *www.naturalnews.com/045009_brominated_vegetable_oil_Coca-Cola_sucrose_acetate_isobutyrate.html*

[h] *www.wnyc.org/story/secretive-manufacturers-association-regulating-food-flavors/*

T-1. Selection of naturally occurring mutagens and carcinogens found in foods and beverages[2]

Compound	Occurrence	Mutagen incidence
Acetaldehyde	Apples, bread, coffee, meat, tomatoes	Mutagen and potent rodent carcinogen
Allyl isothiocyanate	Arugula, broccoli, mustard	Mutagen and rodent carcinogen
Caffeic acid	Apples, carrots, celery, cherry, tomato, coffee, pears, grapes, lettuce, mango, potato	Rodent carcinogen
Coumarin	Cinnamon	Rodent carcinogen
Estragole	Apples, basil	Rodent carcinogen
Ethyl acrylate	Pineapple	Rodent carcinogen
Furfural	Bread, coffee, nuts, sweet potato	Rodent carcinogen
D-Limonene	Black pepper, mango, oranges	Rodent carcinogen
4-Methylcatechol	Coffee	Rodent carcinogen
Methyl eugenol	Basil, cinnamon, nutmeg, apple, pumpkin	Rodent carcinogen

somewhat one-sided view on the subject matter, using examples of castoreum, a chemical derived from a beaver's anal glands, as an example of why the current system is flawed.[i] (On the other hand, National Public Radio has devoted segments featuring the scientific community's perspective on added flavor to educate readers on an academic standpoint.[j])

This and other articles have the potential to drive consumers to the conclusion that anything added to food is harmful, leaving nothing to differentiate between natural and artificial.

The Chemophobia Influencers

Van Hari, a food blogger known as the "Food Babe," is a leader of the chemicals-equals-bad movement. She has fashioned for herself a growing band of followers who believe that chemicals are inherently toxic. What began as a whisper has grown in volume to reach the mainstream public following Hari's appearances on CNN, Al Jazeera, NBC, Good Morning America, Fox News and Dr. Oz. The Food Babe's appearance on these shows contribute to an inaccurate message for consumers regarding chemophobia. As this message spreads, it could lead to legislative change that is detrimental not only to the food and flavor industries, but also to public health.[2]

Hari states,"Reducing all synthetic, artificial chemicals is best, but it is difficult to avoid each and every one of them in all amounts."[k]

Hari's success highlights how well she understands the message, i.e. all chemicals are bad, which large sections of consumers are keen to hear, and how to utilize this for her own commercial gain. This is something she reinforces with statements such as "if I can't pronounce it we shouldn't eat it." All this, of course, is aimed at driving consumers to Hari's version of healthy living, and to buy her book, "The Food Babe Way." It appears that consumers are unable to see past her weak claims and realize they are part of a commercial machine mobilizing her success. We should all remember, however, that as plausible as she sometimes sounds, this is the blogger who, on October 5, 2011, tweeted **(F-1)**, "Did you know the #flushot has been used as a genocide tool in the past. Think twice."

F-1. The Food Babe, a chemophobia thought leader, has tweeted some truly reprehensible and erroneous comments

The response to some of Hari's blogs have been scathing. Her nemesis comes in the form of Yvette d'Entremont, a writer with a B.S. in chemistry and an MS in forensic science. D'Entremont's posting on Gawker attacked Hari, systematically picking apart some of Hari's well-known claims.[l] Other bloggers, such as James Fell, are also offering a view based on more scientific fact and so it appears that the scientific community is somehow finding a voice in online media.

The problem potentially lies in the message being disseminated. Science by its very nature is difficult to understand or present in bite-sized segments. Typically, the public tends to mistrust any message upon which they cannot quickly form an opinion, and instead relies on the credence of the messenger

[i] *www.marketplace.org/topics/business/ive-always-wondered/finding-natural-natural-flavors*

[j] *www.npr.org/sections/thesalt/2014/12/04/364745790/food-babe-or-fear-babe-as-activist-s-profile-grows-so-do-her-critics*

[k] *http://scienceblogs.com/insolence/2015/02/12/the-food-babe-there-is-just-no-acceptable-level-of-any-chemical-to-ingest-ever/*

[l] *http://gawker.com*

to gauge the validity of the message. It seems that, as far as the public is concerned, the easy lie from a celebrity is more believable than the difficult truth from the scientist.

Fear Factor: Social Media as a Vehicle

While the food and flavor industry continues to expand with new technologies and developments, social media has evolved communication from a single-news-source world to one that is hyper-connected and global, with a diffusion of authority when it comes to creating and sharing information.

What gets shared online is based on humans' four basic emotions. A 2014 study indicated that four basic emotions combine to create our experiences: happy, sad, afraid/surprised and angry/disgusted.[m] These emotions have implications for how we share content online. Given that scientific reports appear intimidating and cause concern when read by non-scientific audiences and underline the negative point of view of "chemicals bad, natural good," we can start to look at the impact of that effect on how information is spread across social platforms. Of the four of these emotions, anger and fear are the two most relevant of our baseline group.

Fear or surprise makes us desperate for something to cling on to. The theory is that when we're scared, we need to share the experience with others—we cope with fear by bonding with other people, and we use shared content and opinions to create those bonds on social channels. Being fearful of giving her family foods containing apparent toxins, a concerned Mom will share a blog post with her Mom's group via Facebook and Twitter, whether or not she knows it is 100% accurate.

Jonah Berger, professor of marketing at the University of Pennsylvania's Wharton School and author of "Contagious: Why Things Catch On," studied nearly 7,000 articles in the New York Times to determine which articles displayed a high share rate. The study found that content that inspires high-energy emotions like awe, anger and anxiety is far more likely to be shared. Anger in particular can create a curious form of stubbornness online, as a recent University of Wisconsin study discovered.[3] Anger was also the most viral emotion studied, especially when it is directed at a topic, such as chemicals or food, rather than an author or publication.

Consider the numbers: there are 1.44 billion active monthly users on Facebook alone. Add that to the 302 million monthly active users on Twitter, along with other social platforms. Most of those doing the talking in certain cases are not going to have reliable information, but they're still going to keep talking. A 2011 University of Michigan study of five rumors on Twitter showed that 43% of the users surveyed seemed to believe the false information they were posting (rather than debunking it or posting it neutrally).

Currently, we gather information from a variety of sources, rather than the old model of single-source newsgathering. Pew Research Center studies show that almost a third of U.S. adults receive a portion of their news from Facebook, where authoritative sources are jockeying for position with friends and relatives.[n] Robert Cialdini's book, "Influence—The Psychology of Persuasion," outlines that people are more likely to trust information that come from people they know.[4]

Incorrect and often misdirected information sent to the public via social media creates chemophobia, negatively impacting the food and flavor industry.

As today's global newswire, Twitter delivers breaking news in seconds. It can also be a source of highly viral false rumors that spread quickly due to the platform's immediate nature. A single false statement can quickly make a tremendous impact, costing companies and individuals their integrity and millions of dollars in losses. This was seen during the confusion following the bombing of the 2013 Boston Marathon. In that case, online sleuths, with the best intentions, misidentified a missing college student as a primary suspect in the bombing. His name and face ended up trending nationally on Twitter, despite having no involvement in the attack. Social media's power was also revealed when hackers broke into the Associated Press's Twitter account last spring and posted a message claiming that the White House had been attacked; as a result, the S&P 500 Index immediately fell, wiping out about $130 billion in value in seconds.

Research shared by crisis experts shows that during crisis events, two currents of information often compete with each other.[o] The first is the expression of fear, which can quickly progress to hysteria. Because of their instant connection with subscribers and followers, news outlets and social media response can quickly fuel the fear. The second is the attempted effort by authoritative sources such as health organizations and government agencies to contain fear and alleviate hysteria.

Nicholas DiFonzo and Prashant Bordia's book, "Rumor Psychology: Social and Organizational Approaches," cites how rumors often arise in contexts of ambiguity, danger or potential threat.

The book notes how the public often has trouble differentiating between the story of "we think we might have a problem," and "we know we have a problem," and demonstrates that today, they will not suspend judgment waiting for official responses via TV, traditional media, or radio.

To prevent the human tendency to search for alternative sources of information, the food industry needs to band together to respond and send trusted information out onto social channels. Easily accessible social channels are sources of uncertainty, whether or not the source is verified or truthful.

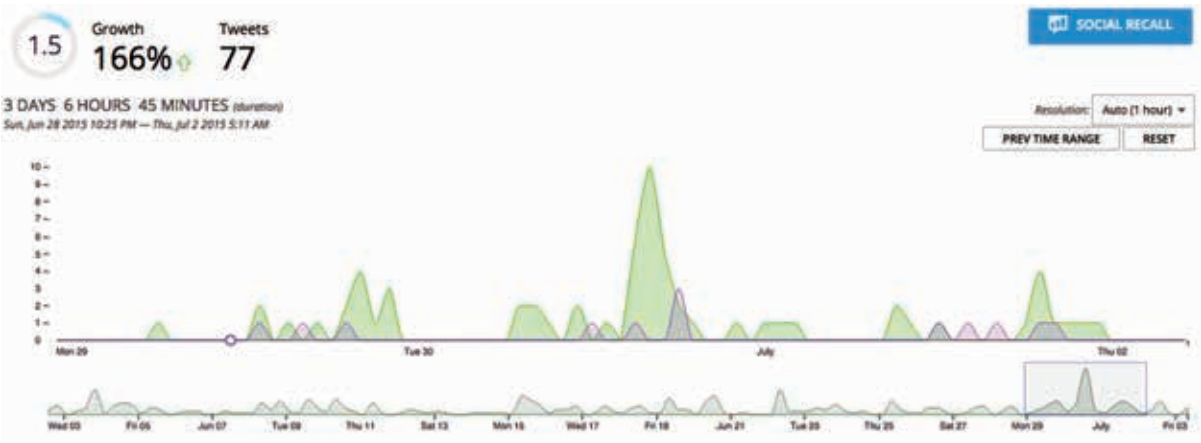
Mapping the Social Footprint in Real Time

F-2, from social analytics company Spredfast Intelligence, shows the immediate impact of social channels on spreading opinions surrounding food-related issues.

The purple line shows the Twitter activity of The Food Babe (@thefoodbabe) over a period of 3.5 days. The green line shows the activity of her followers in that same timeframe, tweeting using the hashtag #foodbabearmy. They use this hashtag to identify as a group and share her content quickly. The two lines show how her content is quickly shared and amplified by a core group of loyalists, each with their own established social footprint.

[m] *www.fastcompany.com/3027699/how-our-brains-decide-what-we-share-online*
[n] *www.journalism.org/2013/10/24/the-role-of-news-on-facebook/*
[o] *http://blog.hootsuite.com/citizen-engagement-crisis-management-on-social-media/*

F-2. Visualization, via Spredfast, of food-related social channel chatter (see Mapping the Social Footprint for details)



This second graph **(F-3)** from Spredfast Intelligence shows that social footprint with another example of a tweet recently shared by The Food Babe.

To combat the spread of misinformation on the flavor and food industry, real-time analysis of social media content, using tools such as Spredfast's Intelligence Topsy or Bottlenose, is a good method of defense. To fight against highly viral emotional content, the food industry needs to listen carefully to the misinformation being shared in real-time.

Diving into the social conversation is a must. The only way to correct misinformation is to listen, find a voice and quickly correct misinformation across social channels using impactful visual content, verified sources and powerful facts.

F-3.

Promoting Chemical Literacy

Professor Joe Schwarcz, director of McGill University's Office for Science and Society, presented the phrase "there are no safe substances, only safe ways to use substances in a TEDx talk in Montreal in 2012.[P] While this is absolutely true, lack of knowledge breeds fear, and this fear only adds to the skepticism in which science, and particular chemistry, is treated.

In his talk, Professor Schwarcz mentioned how often people strive for a product which is free of chemicals, which for a chemist is certainly an interesting concept. He jokes that buying a product which is chemical free is in fact not a very good deal at all, as what you are in fact paying for is a vacuum— precisely, nothing. He added that when you take a bite of an apple you ingest acetone, most commonly known for its use in nail polish remover, and formaldehyde, known by most people as embalming fluid. (He joked that should the "toxic" acetone kill you, the formaldehyde would keep you perfectly preserved.)

When consumers speak about "chemicals," they're actually referring to toxins; the lack of clarity in the consumer's mind between a chemical and a toxin is the key problem. As a result, chemicals and chemistry have an image problem. Chemicals, in the consumer's mind, are those nasty things which we don't want or need, which make us sick or cause illness. Tie this into the flavor and food industries, and we have a serious issue. The American Chemistry Council, in conjunction with the Royal Society of Chemistry, recently re-launched its Sense about Science website (www.senseaboutscience.org), which outlines the six misconceptions the public has about chemicals **(T-2)**.

Misconception number 5 is one of my personal favorites. Within the flavor world we are all too familiar with the consumer belief that natural is better. **F-4**, produced on behalf of Sense about Science by www.CompundChem.com (who, in

[P]https://www.youtube.com/watch?v=YdkPt6DUKuI

T-2. The six misconceptions the public holds regarding chemistry, according to the America Chemistry Council*

1	You can lead a chemical-free life	The reality is that you cannot lead a chemical free life. Everything is made of chemicals. Chemicals are substances and chemistry is the science of substances—their structure, their properties and the reactions which change them into other substances. Claims that products are "chemical free" are untrue. There are no alternatives to chemicals, just choices about which chemicals to use and how they are made.
2	Man-made chemicals are inherently dangerous	Whether a substance is manufactured by people, copied from nature or extracted directly from nature tells us nothing about its properties. In terms of chemical safety "industrial", "synthetic", "artificial" and "man-made" do not necessarily mean damaging and "natural" does not necessarily mean better.
3	Synthetic Chemicals are causing cancers and other diseases	Many of the claims about chemicals being linked to diseases simply tells us that a chemical was present when an effect occurred, rather than showing that the chemical causes the effect. Caution is needed when reporting apparent correlations: it is in the nature of scientific experiments that many disappear when further testing is done or they turn out to be explained in other ways.
4	Our exposure to a cocktail of chemicals is a ticking time bomb	Although the language of "cocktail" and "time bombs" is alarming, neither the presence of chemicals nor the bioaccumulation of them, in themselves, mean that harm is being done. We have always been exposed to many different substances, because nature is a "cocktail of chemicals". Modern technology enables us to detect miniscule amounts of substances, but the presence of such a small amount of a specific substance does not mean that it is having any discernible effect on us or future generations.
5	It is beneficial to avoid man-made chemicals	The reality is that, insofar as there is a "need" for anything, synthesized and man-made chemicals have given societies choices beyond measure about what they are exposed to and the problems they can solve.
6	We are subjects in an unregulated, uncontrolled experiment	There is an extensive regulatory system that strictly controls what chemicals can be introduced: what experiments can take place, what can be used, for which purpose and how they should be transported, used and disposed of.

**www.senseaboutscience.org*

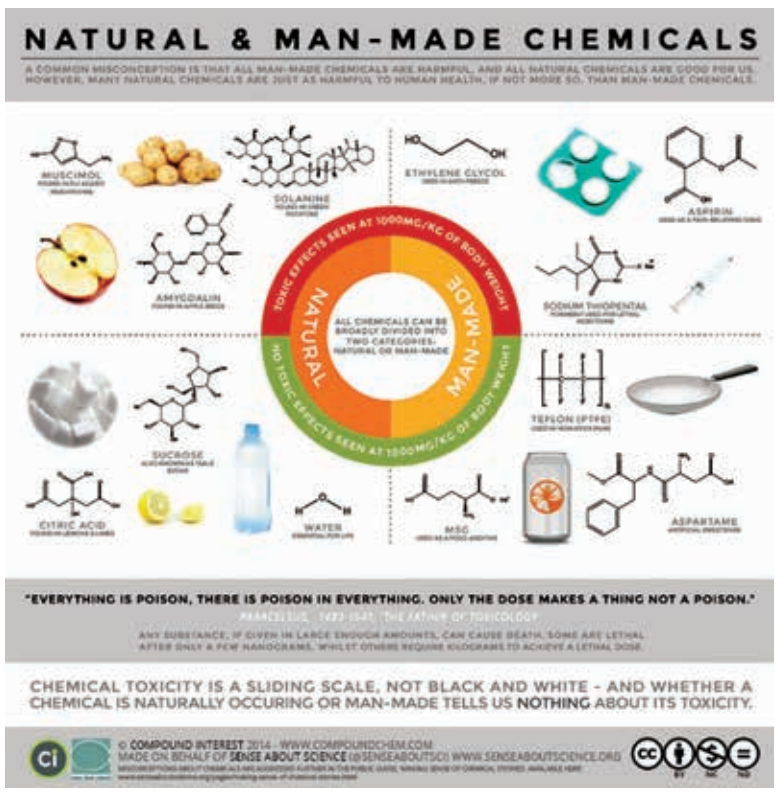
addition to this, have excellent infographics in other areas related to the food and flavor industry), illustrates this point perfectly. Whether a chemical is natural or man-made tells us nothing about its toxicity. The naturally occurring botulinum is one of the most toxic substances known to man; a quarter of a teaspoon could kill a quarter of the world's population.[q]

As bloggers pick up on this message, it will spread, which can only be a positive thing for the flavor industry and the chemical industry as a whole.[r] It is clearly as important to be scientifically literate as it is to be numerically or vernacularly literate. With the flavor industry in mind, is it the duty of the flavor industry to educate the public in chemical literacy?

Food Industry Reactions

In general, the public continues to remain skeptical about any chemical in its food, particularly in the natural versus artificial

F-4. Natural and man-made chemicals and toxicity



[q] *http://www.rsc.org/images/NaturalNotes_tcm18-115179.pdf*

[r] *http://health.usnews.com/health-news/blogs/eat-run/2015/06/19/should-you-fear-chemicals-in-your-food*

debate. This certainly isn't helped by the recent removal of artificial flavors from products by a raft of multinational food and drinks manufacturers such as General Mills and Nestle[s,t] and large restaurant chains such as McDonalds, Taco Bell and Papa Johns have widely publicized their ingredient removal initiatives in an attempt to curry consumer favor. This move will cost Papa Johns alone an estimated $100 million.[u,v,w] Panera Bread has gone as far as to draw up and publish a list of the "No No" ingredients they are removing from their food **(F-4)**.[x] Interestingly this list includes materials like parabens, which could prove tricky to remove if Panera wishes to continue to use real blueberries—in which the chemicals naturally occur—in their blueberry muffins. The disconnect in the scientific understanding of flavors and food is further reinforced by Panera's inclusion of vanillin, which is a key component of any vanilla extract.

Visibility: The Case for Engaging the Public

The language of science, which is careful in its message so as not to make unproven or unsubstantiated claims, unfortunately doesn't lend itself to the "shock and awe" communication of the internet. Despite all of these challenges, there are still attempts to disseminate accurate and meaningful information to consumers. The recent furor around pumpkin spice latte in the media led the Institute of Food Technologists (IFT) to publish a Pumpkin Spice 101 online covering not only how pumpkin spice flavor is made, but also the regulatory aspects of the drink.[y,z]

While this is a commendable move from IFT, the problem here is visibility. I am an IFT member, yet it was only while searching online for something on pumpkin spice latte that I came across Pumpkin Spice 101. Other examples of the scientific community attempting to get accurate information to the public can be seen in articles from Scientific American.[aa]

The subject of industry visibility is an important one. The companies who make up 80% of the flavor industry are multi-billion-dollar entities that are largely invisible to the general public. Similarly, the bodies and trade associations that represent the industry, such as the Flavor and Extract Manufacturers Association (FEMA), the International Federation of Essential Oils and Aroma Trades (IFEAT), and International Organization of the Flavor Industry (IOFI), do not appear on the average consumer's radar. This lack of visibility breeds mistrust, and plays into the hands of the visible, pseudoscientific community.

If industry trade groups, companies, the scientific community and the comparatively small portion of the community that is truly interested in the science on these subjects cannot spread their message beyond their constituents, are they reaching a wide enough audience to educate the public? If not, then there is a very one-sided discussion being had within consumer circles and, more worryingly, at a legislative level.

A recent bill proposed by Rep. Rosa DeLauro (CT) and Sen. Richard Durbin (IL) proposes the transfer of food safety, labeling, inspection and enforcement functions performed by other federal agencies to the Food Safety Administration.[bb] It also proposes an "integrated food safety research capability, utilizing internally generated, scientifically and statistically valid studies in cooperation with academic institutions and other scientific entities of the Federal and State governments and to achieve the continuous improvement of research on foodborne illness and contaminants." This could have a significant effect on the flavor industry and the Generally Recognized as Safe (GRAS) system administered by the Flavor and Extract Manufacturers Association (FEMA).

At the same time, attacks on the industry from the Natural Resources Defense Council (NRDC) and the Center for Science in the Public Interest (CSPI) show no sign of abating. The NRDC in particular are especially vociferous with their "Generally Regarded as Secret" campaign requesting that people contact the Commissioner of the Food and Drug Administration via their website. This message is echoed by the CSPI, for whom Lisa Lefferts is particularly critical of FEMA and their apparent lack of transparency.

[s] *http://blog.generalmills.com/2015/06/a-big-commitment-for-big-g-cereal/?_ga=1.138428659.116334188.1435160208*

[t] *www.foodsafetynews.com/2015/02/nestle-to-remove-artificial-flavors-colors-from-chocolate/#.VYrtmGdRFdh*

[u] *www.fastf4oodnutrition.org/blog/48_b-mcdonalds-cuts-artificial-flavors-chemicals-from-grilled-chicken.html*

[v] *www.wsj.com/articles/taco-bell-to-remove-artificial-flavors-coloring-1432638320*

[w] *www.businessinsider.com/papa-johns-spends-100-million-to-ban-chemicals-from-food-2015-6*

[x] *www.panerabread.com/panerabread/documents/panera-no-no-list-05-2015.pdf*

[y] *www.npr.org/sections/thesalt/2014/11/19/365213805/just-what-is-in-pumpkin-spice-flavor-hint-not-pumpkin*

[z] *www.ift.org/Knowledge-Center/Learn-About-Food-Science/Food-Facts/Pumpkin-Spice-101.aspx*

[aa] *www.scientificamerican.com/article/what-is-the-difference-be-2002-07-29/*

[bb] *http://delauro.house.gov/images/pdf/SafeFoodAct2015FINALBill.pdf*

Lefferts misleadingly states, "The main reason to be concerned about flavors, whether they are natural or artificial, is that when they are in there, you can be pretty sure that something real and nutritious has been left out."[i]

If the criticism here is that the industry is secretive, then maybe we need to reflect on this from within the industry. Is it time to take a leaf out of the fragrance industry book? In response to similar waning consumer confidence, and the threat of attack from advocacy groups, The International Fragrance Association (IFRA), together with the industry scientific center RIFM (the Research Institute for Fragrance Materials), has taken a proactive approach to engaging with legislators and consumers. Their publication of the document, "Valuable et Vulnerable: Trade Secrets in the Fragrance Industry," shows the precarious nature and socioeconomic impact of the fragrance industry. The publication acknowledges the need to balance ingredient disclosure and trade secret protections, which make the industry economically important and viable, with growing demand for greater transparency. IFRA North America (IFRANA) in particular has taken a proactive approach to working with lawmakers—similar to FEMA's congressional fly-ins—which appears to be fruitful. Attempting to engage consumers while promoting fragrance as a positive experience is encouraging.

The focus on transparency has also shifted to the consumer goods manufacturers. Recently, SC Johnson launched the website *www.WhatsInsideSCJohnson.com*. The website includes a specific section for fragrances, which includes a link to RIFM and a list of all of the materials included in SC Johnson's fragrance formulations. Of course, there are no specific formulations listed, which helps protect individual expertise, intellectual property, trade secrets and proprietary knowledge. However, has expanded its program to disclose product-specific fragrances to consumers for its Glade air care products. FEMA is also moving toward greater audience engagement. Its website, *www.flavorfacts.org*, and Twitter handle, @flavorfacts, is a beginning. Perhaps greater collaboration between the industry associations with participation from the flavor market, as well as the food industry, can lead to further consumer engagement and education. In turn, this collaboration can spread the word that flavors, whether artificial or natural, are well regulated, safe and part of the consumer's overall experience of food enjoyment.

Conclusion

We will end where we began, with a couple of quotes:

"Truth will ultimately prevail where there is pains to bring light to it." – George Washington

And

"The problem with the internet is that you never know which of the quotes are true." – Benjamin Franklin

It is time for the industry, along with the organizations who represent it, to bring the truth to the public rather than hope the public works out the truth.

Address correspondence to Steve Pringle; s.pringle@acsint.com

References

1. G Gribble, Food Chemistry and Chemophobia, Food Security, 5(2), pp 177-187, 2013
2. Scared to Death: How Chemophobia Affects Public Health, Jon Entine, Amercan Council on Science and Health, 2011
3. AA Anderson, D Brossard, DA Scheufele, MA Xenos and P Ladwig, Journal of Computer Mediated Communication, 19(3), 373–387 (2014)
4. RB Ciadini, *Influence: The Psychology of Persuasion*. Revised Edition, Harper Business (2006)