Citrus Oils: The Regulatory Horizon

Jon Leonard
Renewable Citrus Products Association
Florida Chemical Company
Regulatory

- Regulatory means the actions, laws or rules designed to control the use or transportation of goods
- REACH, DOE, CARB, DOT, EPA, FDA, FTC, OSHA
- MSDSs, Certifications: Natural, GMO, Allergens …
- Recently, the President of a $30B chemical association defined regulatory as “Slow slicing” - or death by a thousand cuts (Chinese língchǐ)
- Opportunity
Regulatory – Reality - Humor

Can I buy some emissions credits from you? I'm releasing methane way over my limit today!

Bovine Cap and Trade

By permission of Bill Whitehead and Creators Syndicate, Inc
Looking back to the 1980’s our industry had few regulations and many friends.

“Approximately 80 percent of our air pollution stems from hydrocarbons released by vegetation. So let's not go overboard in setting and enforcing tough emission standards for man-made sources.” --Ronald Reagan

as quoted in Sierra, September 10, 1980
2008
Green - Renewable - Sustainable

- Front page of every newspaper, every newscast
- The citrus industry is in an excellent position to promote citrus oils as a Natural Solution for the environmental movement
- Citrus oils are in a better position than corn or soybean products
  - They are extracted from a by-product of the citrus juicing industry
  - Their use does **NOT** consume or impact a human food item
Green

- Everyone’s definition of “Green” is different
- It’s the new buzz word
- Most are using it as a marketing tool
- What’s your definition of Green?
- Phone a friend
- “Yellow and blue make green”

DAVID McKEITHAN
Renewable

- “It is probably true that all green plants in nature produce limonene through their biochemical metabolism.” Braddock 1999

- Renewable means biobased as opposed to fossil-based
Renewable

- Chemicals and energy products based on citrus, corn, soybeans, wood chips, etc. are renewable
- Citrus oils degrade to carbon dioxide and water
- This carbon dioxide is available for more plant growth in a closed loop and therefore does not contribute to climate change
- Non-renewable fossil-based chemicals contribute to global warming
Sustainable

- Sustainable means consuming a material at a rate that can go on forever
- Using petroleum for energy and chemicals is not sustainable
- Extracting citrus oils from a by-product of the juicing industry produces a sustainable product that does not contribute to climate change
- Besides water “Can you think of a more sustainable product?”
Current Regulatory Status

- Government Organizations are regulating the citrus oils industry
- Some are helpful; e.g. FDA’s GRAS
- Some are not; e.g. VOC restrictions
- Some are subtle; e.g. EPA’s DfE focus on d-limonene
- Some are looming; e.g. IAQ regulations
- Some require effort to make them helpful; e.g. CARB Climate Change regulations
Current Regulatory Status

- Outsourcing Trend
- Non-Government Organizations (NGO) are beginning to regulate us
  - Green Seal
  - CleanGredients
  - GreenBlue
  - EcoLogo
- The Media is targeting chemicals and citrus oils in particular; regulations will follow
Current Regulatory Status

- Regulations can have far reaching impacts
- Regulations can crossover from governmental agency to governmental agency
  - CARB is taking their VOC emission inventory from consumer products and Cal EPA is using it as a basis for climate change
    - Not Logical!!!
  - Citrus Oils are renewable and do not contribute to global warming
Current Regulatory Status

- Regulations can crossover from governmental agencies to NGOs:
  - Certification Organizations (NGOs) can adopt governmental regulations in their standards
  - Example: Green Seal will adopt a federal regulation and then add their own twist to it
  - Another example: DfE protocols are incorporated into CleanGredients’s protocols
Current Regulatory Status

- Regulations can crossover from NGOs to governmental agencies:
  - NGOs test products off the shelf
  - Mass Merchandisers ban phthalates from toys
  - The FTC’s CPSC bans phthalates in toys
  - Then the EPA starts looking at phthalates in air fresheners
  - Next the FDA starts looking at phthalates in medical delivery devices, IV bags, etc.
Current Regulatory Status

- Regulations are dynamic – always expanding, they never disappear
- Proactive regulatory will bring value to our industry
- Opportunities to reposition citrus oils as better than fossil-based offsets
- What we need is an association to **Educate** the regulators
Proactive Regulatory

- Citrus by-products have a long history of safe use in food, drinks and consumer products such as perfumes and cleaners
- To support our position, the industry formed the Renewable Citrus Products Association or RCPA in June of 2008

- The FCPA helped us form the RCPA
The stated purpose of the **RCPA** is to proactively address and influence the legislative and regulatory challenges of the citrus oils industry at the federal, state and international levels, so as to enhance the business opportunities for its members.
Renewable Citrus Products Association

- Membership in the RCPA is open to national and international companies that grow citrus, process, import, distribute and use citrus oils.
- RCPA would like to thank the FCPA for all of their efforts to bring us together.
Renewable Citrus Products Association

- The **RCPA** has been incorporated in the District of Columbia to be near and for easy access to other associations.

- The operations of the **RCPA** are governed by a set of by-laws, which regulate the internal affairs of the Association. In effect, the by-laws set forth the rules by which we operate.
The Objectives of RCPA

- Establish a presence in the regulatory community
- Promote citrus oils as biobased, renewable and sustainable with the public, media, NGOs and governmental agencies
- Develop an environmental impact/life cycle assessment of citrus oils
- Develop the sustainability profile for citrus oils
The Objectives of the RCPA

- Secure proper treatment of citrus oils with respect to volatile organic compound regulations
- Secure proper treatment of citrus oils with respect to indoor air quality regulations
- Conduct environmental, health and safety research on citrus oils based on sound science
Why should you join the RCPA?

- For the good of the industry - Economic Stability
- To improve our product stewardship - Citrus Industry Citizenship
- Adds value to our products
- We need to parallel the Green Movement and defend our product lines - Advance the Industry
- Solidify Citrus Oils as biobased, biodegradable, renewable, sustainable and, above all, safe
RCPA Today

- **President Elect**
  - Jon Leonard, Florida Chemical Company
- **Vice President** (nominated)
  - Nick Emanuel, Citrosuco NA
- **Treasurer** (accepting nominations)
- **Secretary** (nominated)
  - Dr. David McKeithan, Firmenich
- **Executive Committee Member**
  - Dr. Tim Anglea, Coca-Cola North America
- **Executive Committee Technical Advisor**
  - Dr. Robert Braddock, Professor Emeritus – UF
Challenges - VOCs

- **Outdoor Air Quality Issues**
  - Volatile organic compounds (VOCs), chiefly hydrocarbons from petroleum and *natural* sources, are known to react with nitrogen oxides in the presence of sunlight to cause the formation of ground-level ozone that causes air pollution or smog.
  - Smog has adverse effects on public health, particularly the health of children, older people, and those with respiratory diseases such as asthma.
  - d-Limonene and citrus oils are naturally occurring hydrocarbons and are classified as 100% VOCs
Challenges - VOC Regulators

- California Air Resources Board (CARB)
- Ozone Transport Commission (OTC)
- Federal EPA National Consumer Products Rule
- International VOC Rules (Canada, Hong Kong, etc.)
Challenges - VOC Timeline

- California's Legislature established the California Air Resources Board (CARB) in 1967
- Congress formed the Federal EPA in 1972
- CARB passed their first Consumer Product VOC Regulation in 1996
- The Ozone Transport Commission (OTC) modeled on CARB regulations became effective in 2005 (CT, DE, D.C., ME, MD, NH, NJ, NY, PA, VA)
- The National Consumer Product VOC Regulation based on the OTC Model will be proposed in 2009
Challenges - VOCs

- CARB began regulating coatings in 1996
- CARB now regulates 135 different categories of consumer and commercial products
- Example of the impact on a typical category
- **Category: General Purpose Degreasers**
  - 100% VOCs Until 12/30/2006
  - 4.00% VOCs Effective 12/31/2006
  - 0.50% VOCs Proposed for 1/1/2011
Challenges - Global Warming

- California Assembly Bill 32 (The Global Warming Solutions Act of 2006)
- Renewable Chemicals, such as citrus oils, need to be counted as VOCs, but not as Global Warmers because they are plant-based and not fossil-based
- The United States will follow the regulations being developed in California
- The world will probably follow the U.S.
Challenges - Indoor Air Quality

- California Assembly Bill 1173 (September 2002)
- Draft Report to the California Legislature, Indoor Air Pollution in California in response to Assembly Bill 1173 (May 2004)
- Florida Chemical along with the
  - Florida Citrus Processors Association
  - Florida Citrus Mutual
  - Florida Department of Citrus
  - Florida Department of Agriculture and Consumer Services
  - CSPA and the ISSA
  - all worked together to lobby CARB and obtained significant corrections and changes in the draft report before the Final Report was issued
- Final Report to the California Legislature Indoor Air Pollution in California (July ‘05)
Challenges – Indoor Air Quality

- A CARB “Fact Sheet” dated November 2007 states that “…using products that contain terpenes – which are components of pine and citrus oils – in rooms where ozone is present resulted in the production of formaldehyde and ultra fine particulates, both of which can potentially harm human health.”

- “Limit the use of cleaning products advertised as pine- or lemon-scented, or that contain pine or citrus oils on high outdoor pollution days”
Challenges - Health and Safety

- Citrus Oils are a common target in Academic Research Studies

- Research papers by Karlberg at the National Institute of Health/Solna, Sweden, report auto-oxidation of terpenes forms oxidation products that sensitize Guinea pigs ... then
Challenges - Health and Safety

- Research paper by Matura from Stockholm, Sweden stated that: “Limonene is the first example of a chemical, although not allergenic itself, was labeled within the European Community with the Risk Phrase R43.”

- Research papers by Nazaroff, at the University of California, report chamber studies of ozone and terpenes in cleaning products and air fresheners react to create formaldehyde and fine particulates.
Challenges - Health and Safety

- Research papers by Steinemann, researcher at the University of Washington, claims fragrance ingredients such as d-limonene are potentially toxic.
- Research paper by Kinney at Colorado State claims d-limonene bioaccumulated in earthworms; they were probably measuring the chemicals in wood chips as d-limonene.
Challenges - Health and Safety

- Aquatic Toxicity Issues
- Allergy/Asthma/Respiratory Irritant Issues
- Bioaccumulation and Biodegradability
- Biomonitoring and Biotransformation
- Skin Sensitivity Issues
Challenges - International

- Challenges will surface around the world
- Citrus Oils banned in products used to clean government buildings in British Columbia
- Canada, Europe and Hong Kong have introduced VOC regulations based on the California model as a standard
Challenges - Media

- **Southern Living**, a monthly periodical, in March 2008 published an article on Green Cleaning and said:

  “Many orange cleaners use d-limonene from orange peels. It is a great cleaning agent for grease, but it’s flammable and an air pollutant. If it says all natural, be suspicious.”
Challenges - NGO

- The Environmental Health Association of Nova Scotia states in their “Guide to Less Toxic Products” that d-Limonene:
  “…is a sensitizer, a neurotoxin, a moderate eye and skin irritant and can trigger respiratory distress…” and “There is some evidence of carcinogenicity.”
Initial Action Plan

- Proactively establish a presence in the regulatory community
- Evaluate Federal VOC Exemption for citrus oils
- Life Cycle Assessment (LCA) for citrus oils
- Monitor Governmental Certifications
- Monitor NGO Certifications
- Improve image with Public Relations
- Monitor Environmental Groups
Life Cycle Assessment

- A Life Cycle Assessment (LCA) study should be conducted on Citrus Oils.
- A LCA would be very useful as a tool for promoting citrus oils as biobased, biodegradable, natural, renewable, sustainable and, above all, safe.
- A LCA would be the basis for developing a sustainability profile fact sheet designed for distribution to the media.
Life Cycle Assessment

- NSF International could perform an ecological, environmental and toxicological study on citrus oils from cradle to grave called a LCA
- The LCA published by the RCPA would benefit the entire industry and the media would embrace the sustainability profile

- This is our ticket to take Green to Gold
Proactive with Governmental Certifications

- USDA Biobased Products Procurement and Labeling Program
- U.S.EPA Design for the Environment (DfE) d-Limonene profile issues, etc.
- Environmentally Preferred Products (EPP) Programs
- State Green Cleaning School Bills (New York, Illinois, etc.)
Proactive with NGOs

- Green Seal
- CleanGredients
- GreenBlue
- EcoLogo
Proactive with Environmental Groups

- Alliance for Healthy Homes (AHH)
- Environmental Health Association of Nova Scotia (EHANS)
- Environmental Working Group (EWG)
- Mothers for Eco-Justice
- Natural Resources Defense Council (NRDC)
- Sierra Club
- Woman’s Voices of the Earth
Whom do we need to convince?

- Consumers and everyone who reads newspapers, blogs, magazines, listens to the radio or watches TV
- Reporters/Writers/Authors/The Media
- Businesses that sell our products
- Industries that formulate with our products
- NGOs
- Legislators
- Regulatory Agencies
Our Strength is the Truth

- We have an opportunity to replace petrochemicals and expand our markets providing more value for the citrus oils industry
- The “Green Movement” is snowballing!

Time for unified industry action
The Lighter Side - 1st Regulation

- God: Created Heavens and the earth.
- Regulatory Board: Quickly issues a citation. Temp permit issued, but standards would have to be followed or a cease-and-desist would be forthcoming.
- God: “Let there be light!”
- Board: Demanded to know how the light would be made. Would there be strip mining? What about thermal pollution?
- God: Explained that the light would come from a large ball of fire.
- Board: Granted provisional permission - No smoke, conservation of energy, and that the light would be out half the time.
The Lighter Side - 1st Regulation

- God: “Let the earth put forth vegetation, with plants yielding seed and trees bearing fruit.”
- Board: Agreed, so long as only native seed was used.
- And everything was OK — until God said the project would be completed in six days.
- Board: It will take at least 200 days to review the applications and environmental impact statement…public hearing…..then it would be 10-12 months before ...

- At this point, God created hell.