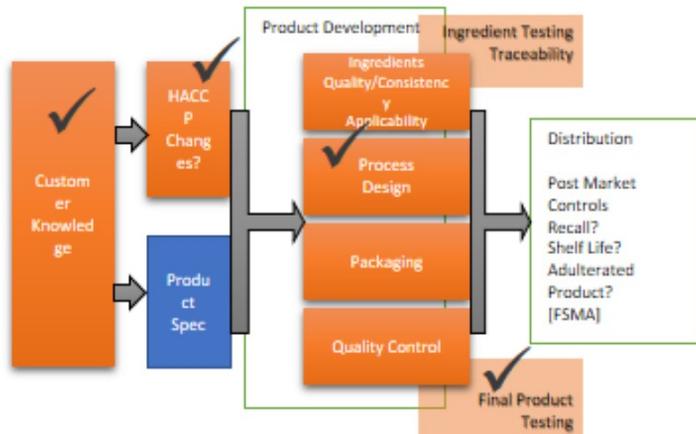


# Processing and Safety

## Legalized Cannabis and Hemp Edibles

---

IFT LCHE (Legalized Cannabis and Hemp Edibles) Working Group



## A significant new food challenge

The transition of cannabis from a prohibited substance to a tightly-regulated medical or adult-use 'ingredient' creates challenges for food science, safety, and development.

This IFT LCHE webinar series highlights commonalities and differences of this new area in fulfillment of one of IFT's basic promises:

***Address issues and influence outcomes in the public dialogue on food issues.***



### **Scott Riefler, CFS**

Scott Riefler has over 39 years of cultivating and commercializing scientific and technological resources. He is currently VP Science for Tarukino, an Intellectual Property Company focusing on novel materials development and product forms within the cannabis space. Prior to Tarukino, Mr. Riefler held a series of leadership roles for TIC Gums, including VP of Sales, VP of Science and Technology, and President. Scott transitioned to food-science after twenty years in the aerospace industry. He literally brings rocket science to the kitchen!

### **Trevor J. Morones**

Trevor J. Morones is the founder of Control Point, food-safety experts dedicated to bridging the gap between craft production and regulatory. Mr. Morones is a culinary trained expert butcher with certifications as IHA Lead HACCP instructor and GFSI auditor. Trevor is active in multiple committees working on safety for cannabis-infused products. He is a member of IFT and the Infused Product Committee at NCIA (National Cannabis Industry Association).



### **Francis J. Boero Ph.D., CFS – Moderator**

Dr. Boero is a scientific technology business specialist returning to food science after over 30-years in healthcare and research. He is the General Manager of Anthea, a group providing product integrity services to cannabis manufacturers. Prior to Anthea, Francis was an International VP for Johnson & Johnson in the areas of wellness, surgical devices, and laboratory analytics. He is serving as the group leader for IFT's LCHE efforts.



# Scott Riefler, CFS

---

Transition to speaker presentations

# IFT Legalized Cannabis Hemp Edibles Group



## Common Processing Techniques for Infused Edibles

Scott Riefler  
VP Science Tarukino  
6/12/18



# Edibles Market Growth



Edibles Are The Next Big Thing For Pot  
Entrepreneurs



Mike Montgomery CONTRIBUTOR  
Write about the many ways technology entrepreneurs can thrive

Forbes



The reason for the explosive growth is that as the pot market expands, it's starting to reach people who don't want to smoke. Overall the smoking rate among adults is down from 20.6% in 2009 to 16.8% in 2014. Edibles provide a discrete, smoke-free experience. And since they can command higher prices, edibles often account for 25 to 60% of a dispensary's profits.



# Edibles Market Profile

## Market Profiling

	WA State	US (Est)	Canada
2018 Kg Total (flower)	102,000 Kg	7,750,000 Kg	889,436 Kg
% Edibles	13%	13%	13%
Total Kg in Edible Market	13,300 Kg	1,007,000 Kg	115,626 Kg
Edible Cannabinoid Market (reduced for higher potency) mg	1.173 billion mg	89.3 billion mg	10.221 billion
Population	7,415,710	305,000,000	35,000,000
Over 21	5,190,997	213,500,00	24,500,000
Alcohol Consumers (70%) mg per year, per consumer	3,633,698	149,450,00	17,150,000
Servings per year, per consumer	596 mg	596 mg	596 mg
	60	60	60



# Dosage, Packaging, How much is Enough?

	<b>THC</b>	<b>CBD</b>
<b>Single Serving:</b>	<b>10 mg</b>	<b>10 to 50 mg</b>
<b>Maximum per package:</b>	<b>100 mg</b>	<b>Not Regulated</b>

25% of new Cannabis users want < 10 mg doses

57% of these seek < 5 mg doses

Terpene Content Matters, They Directly Influences the Experience

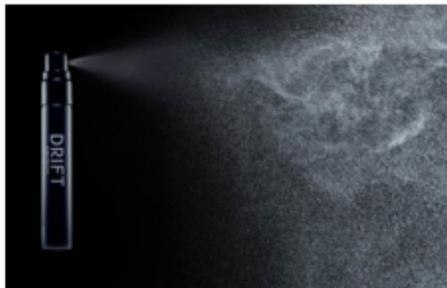
Just like caffeine, alcohol, nicotine or pharmaceuticals  
consumption time and half life matters



# Edibles Market, Product Forms



ZOOTDROPS



# THC Extraction Path Assumptions for Edibles

**Ethanol**

**CO2**

**SC CO2**

**Followed by Distillation**

**Reintroduction of Terpenes**



Some Common Terms:

Winterization (sub zero)

Decarboxylation (220 to 235F)



# What about Terpenes

Common Terpenes	Reported Effects	Aroma	Where Found
A-Pinene (311F):	Anti-inflammatory	Spicy	Bay Leaves, Tea Tree, Sage
B-Caryophyllene (320F):	Anxiety, Depression	Hoppy	Thai Basil, Black Pepper, Beer
B-Myrcene (334F):	Inflammation, Insomnia	Earthy	Mango, Lemon grass, Eucalyptus, Thyme
D-Limonene (349F):	Mood Regulator, Tumor	Citrus	Lemon, Orange, Peppermint
Linalool (388F):	Insomnia, Inflammation	Floral	Lavender, Mint, Cinnamon
Humulene (388F):	Inflammation, Hunger	Hoppy	Basil, Clove, Hops, Some Evergreens
THC (315F)	Psychoactive, Nausea, Anxiety		
CBD (356F)	non-Psychoactive, Inflammation, Epilepsy		

**No Structure Function Claims**



# Basic Edible Construction Paths

**Combine Cannabis Flower with Food: Brownies, Honey Slides etc.**

**Typically Apply Extracts to Food Substrate**

**Treat Extracts as a Food Ingredient**



# Combination Methods, Considerations

**Oil and Water do mix**

**Flavor/Sensory is King**



**Uniformity, Homogeneity are Critical Attributes**

**We are making food, all food safety criteria (should) apply**

# So How do we do this?

**Oils based materials are a bit easier: Extracts can be directly combined/blended with lipid bases**

**Dry mixes, baked goods: Extracts can be preblended with oil components, preblended with dry ingredients**

**Distillates can be plated onto a variety of powder substrates**

**Liquids: Co-solvents, emulsifiers and related process techniques**

For Edibles View Cannabis and Cannabinoids as Food Ingredients



Magic is in the (proprietary) techniques used



# Edible Process Technologies are Evolving to Meet Consumer Desires

**Dosage level/consistency is easily controlled and repeated**

**Micro-Dosing or the “Goldilocks” model**

**Lift off times are shortening: 10 to 15 minutes**

**Experiences can have a manageable half life**

**Underlying “weed” taste and or bitterness can be removed**

**Experiences can be “formulated” via terpene content**

(Food) Science works, let's use our skills



# Remember, (Food) Safety and Compliance First!



FDA FOOD SAFETY  
MODERNIZATION ACT



"IF YOU CAN'T DESCRIBE  
WHAT YOU ARE DOING  
AS A PROCESS, YOU  
DON'T KNOW WHAT  
YOU'RE DOING."

- W. EDWARDS DEMING



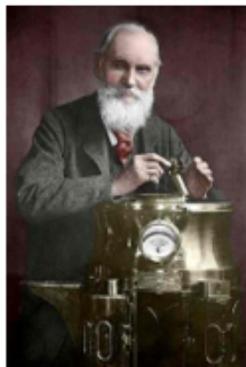
Not to mention regional Cannabis Regulations



# Thoughts for the Material Scientist, Formulator

“ I often say that when you can measure what you are speaking about, you know about it. When you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind. It may be a beginning but you have scarcely in your thoughts advanced to the stage of science, whatever the matter might be.”

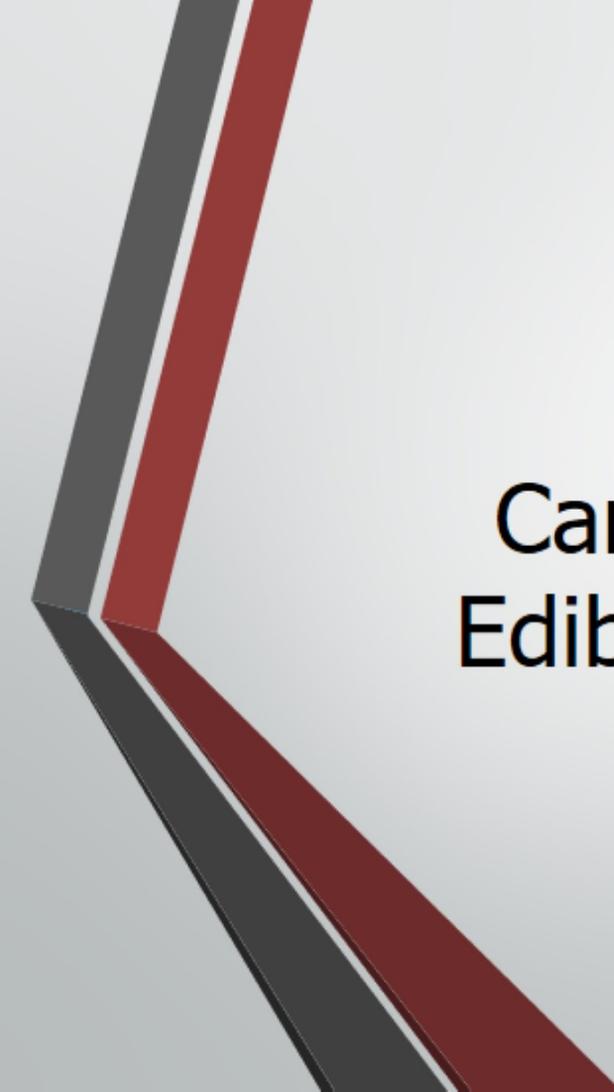
William Thompson  
Lord Kelvin 1883



# Trevor Morones

---

Speaker Presentation



# Food Safety for Cannabis and Hemp Edible Manufacturing

IFT Legalized Cannabis Hemp Edible Group

# Regulatory Gaps



- Create opportunities for manufacturers to apply food safety practices to the infused product industry
- Applying similar food safety practices ahead of federal involvement generates industry ownership.
- Inspector training

# Trial by fire or Lost at sea



<http://sjeetimes.com/2013/06/05/entertainment/lost-at-sea/>

# Results/Common Findings

- Improper GMPs
- Poor GLPs
- High turnover
- Insufficient training
- Missing monitoring & measuring (environmental)
- Inconsistent Company Food Safety Culture
- Food Service type of regulations
- Absence of consumer safety knowledge
- False Marketing

7 HACCP Principles  
Standard Sanitation  
Operating  
Procedures SSOP

Prerequisite  
Programs (PRPs)  
5 Preliminary  
Steps

## Flow Diagram

Intended  
Use

Product

Target  
Customer

Team

# Food Safety Management System Structure

## Foundation

- PRPs
- SSOPs

## Top

- HACCP – Hazard Analysis  
Critical Control Point

# 7 HACCP Principles

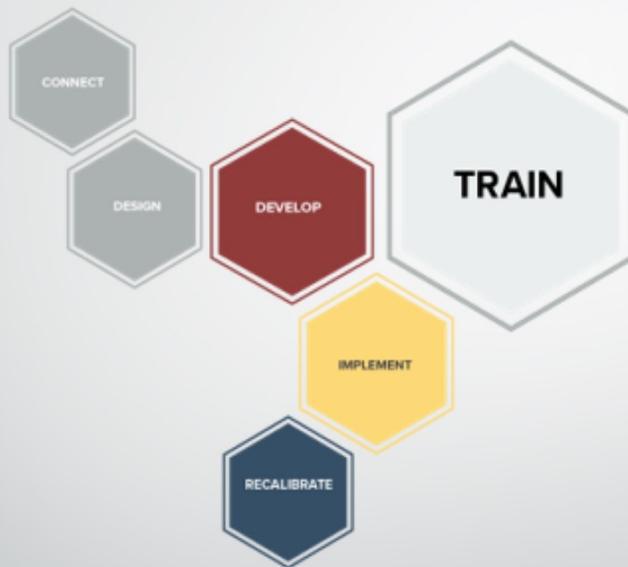
- Conduct a Hazard Analysis
- Determine CCPs
- Establish CLs
- Establish Monitoring Procedures
- Establish Corrective Actions
- Verification & Validation
- Record Keeping

# Company Culture

- Create positive momentum
- Maintain positive momentum by achieving the set expectations, repeatedly



# Food Safety Culture



CP. | CONTROL POINT

# Prevent High Turn Over

- Design on-boarding procedures and training that develop new team members to perform according to the FSMS
  - Provide
    - Resources
    - Time
    - Staff



<https://www.scientedirect.com/>



# Determining usable product/vendors

1. Food Safety – Do vendors meet your approved supplier program requirements
2. Consistency - scarcity of raw product
3. Social - Do they support your social responsibility

# Hazards

Prevent, Eliminate, or Reduce



Dairy



Gluten



Seafood



Soy



Egg



Peanuts



Shellfish



Tree Nuts

<https://d86.hinsdale86.org>



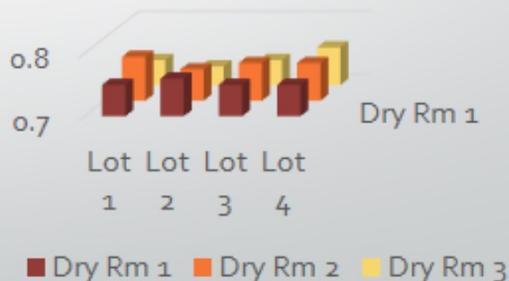
1. Are monitoring task being carried out as intended 2. Does the data collected support the system?

Verification – Direct Observation



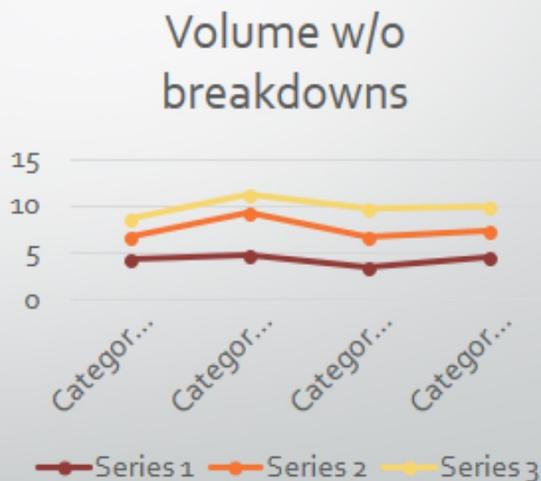
Validation – Using data

### Flower Curing



# Food Safety Value

- Reduce risk
- Operational excellence
- Prevent operational downtime
- Promote operational growth
- **Own the industry**  
(prevent unnecessary regulations)



# Discussion— Q&A

---

## LCHE Live and Archived Webinars

Recorded

### Cannabis and Hemp Edibles – The New Consumer

---

- The creation of legalized, regulated, adult-use, infused edibles markets activates a new group of consumers that do not meet the stereotype promoted by popular media. Academic, non-profit, and industry experts discuss the new consumer and the implications for legalized edibles.

Our experts presented recent consumer research including sales and market data.

June 19, 2018

### Cannabinoids – Testing challenges

---

- Consumer demands for safe, consistent dosing as well as micro-dose edibles (<5mg THC/serving) creates significant challenges for both laboratories and regulators. Cannabis flavorists combining cohort terpenes into food matrices creates further analytical hurdles.

Our special session will be dedicated to a full overview of this exciting analytical area.