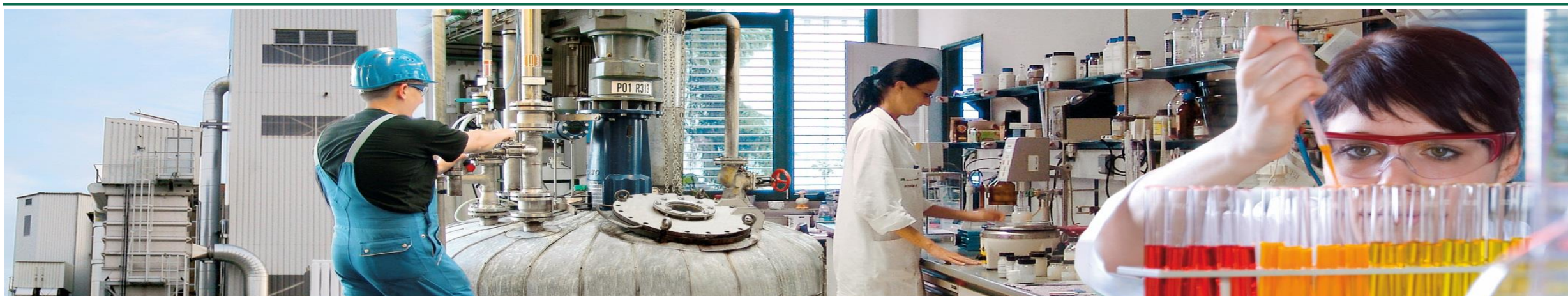




CLEAN LABEL
CONFERENCE



Clean Label Antifoam and Defoamers

Clean Label Conference

March 26-28 2018



MÜNZING 
CREATING ADDITIVE VALUE

Drive for Cleaner Label Products

- ❖ Food Market Growing 3% Annually
- ❖ Consumer demand for Clean Label
- ❖ Organic Market grew 11% in 2015 to \$43.4 Billion
- ❖ Non-GMO growth outpacing Organic for the first time in 2015
 - ❖ Vermont GMO Labeling, Senate Passes GMO Labeling Standard

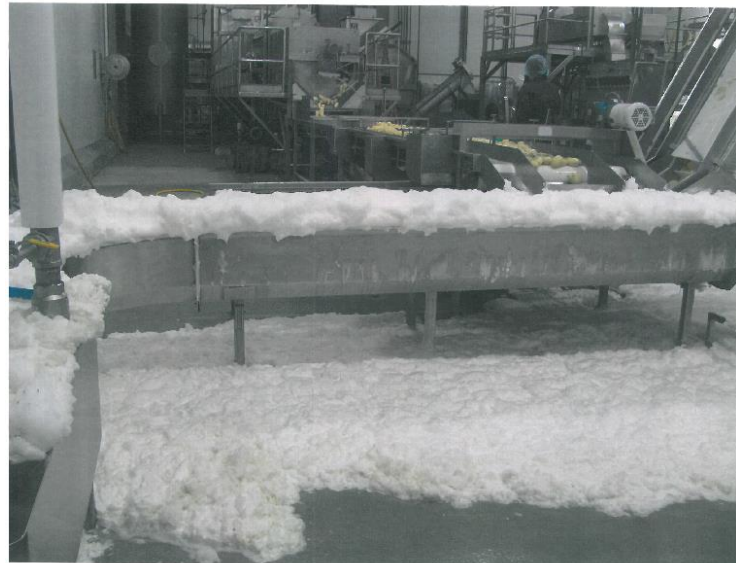
Sources:

U.S. organic sales post new record of \$43.3 billion in 2015. Organic Trade Association. Web. 19 May 2016.

Schweizer, Errol. "Organic and Non GMO Market Growth 2015." USDA Stakeholder Workshop on Coexistence. North Carolina State. Raleigh, NC. 12 March 2015. Keynote Address.

What is foam?

- ❖ Foam is entrapped air/gas in liquid
- ❖ Food is naturally foamy!
 - ❖ Primarily caused by proteins or starch
 - ❖ Mixing generates additional foam



Defoamers vs. Antifoams

❖ Antifoams

- ❖ Prevents Foam or “Hold Down” – proactive
- ❖ Add early in process to prevent foam formation

❖ Defoamers

- ❖ Holds Foam or “Knock-down” – reactive
- ❖ Add later in process to destroy foam

❖ Terms used interchangeably

Chemistry

- ❖ **Core materials:** silicone, mineral oil and vegetable oil (soy & canola based)
- ❖ **Concentration**
 - ❖ Antifoams – 100% Active (better hold down – ideal for continuous processing)
 - ❖ Defoamers - Emulsions (spread better, faster knock down)
- ❖ **Other Products**
 - ❖ Enhanced Polyol (polyalkylene) formulations
 - ❖ Powdered Antifoams (silicone and/or vegetable oil based)
 - ❖ **Organic-Certified & Organic Compliant**
 - ❖ **Non-GMO Project Verified**



Why use Defoamer/Antifoam?

- ❖ Maximize capacity & yield enhancement
- ❖ Improved pumping and mixing
- ❖ Prevent air entrainment
- ❖ Prevent product loss in overflowing containers and shutdowns
- ❖ Improved container filling
- ❖ Plant Safety & housekeeping
- ❖ Improved final product quality, low foam

Antifoam Applications

- ❖ Protein
- ❖ Fruit & Vegetable
- ❖ Beverages & Dairy
- ❖ Jams, Jellies, Syrup
- ❖ Fermentation
- ❖ Sweeteners
- ❖ Powdered Products

Starting Point Formulations - Examples


Formulation Protein RTD	%
Water	80.485
Whey Protein	14.1
Dietary Fiber	4.1
Flavor	0.5
Phosphoric Acid	0.36
Masking Flavor	0.3
Caffeine	0.1
Sucralose	0.04
Color	0.004
Magrabar Antifoam	0.01
Total	100.00

Formulation Protein Shake	%
Water	87.3
Milk Protein	4.1
Whey Protein	2.15
Sodium Caseinate	1.53
Cocoa Powder	1.5
Creamer	1.0
Flavor	0.85
Soluble Fiber	0.70
Vegetable Oil	0.44
Masking Flavor	0.25
Gum	0.10
Lecithin	0.03
Sucralose	0.03
Carrageenan	0.01
Magrabar Antifoam	0.01
Total	100.00

Formulation Oatmeal	%
Water	74.49
Oats	11.3
Cream	5.0
Dried Fruit	2.8
Sugar	2.5
Whey	2.5
Food Starch	1.0
Omega 3	0.10
Cinnamon	0.10
Sat	0.10
Flavor Extract	0.10
Magrabar Antifoam	0.01
Total	100.00

Challenges – Regulatory

- ❖ The primary regulation is **Defoaming Agents listed in 21 CFR 173.340**
- ❖ No FDA “Natural” definition
- ❖ USDA Defines “Natural” as:
 - ❖ No synthetic ingredients
 - ❖ Minimally processed
 - ❖ **Use askFSIS as a resource**
- ❖ Health Food Stores
 - ❖ Most have Quality Standards



Organic vs. Natural		
	Organic	Natural
Toxic persistent pesticides	Not allowed	Allowed
GMOs	Not allowed	Allowed
Antibiotics	Not allowed	Allowed
Growth hormones	Not allowed	Allowed
Sludge & irradiation	Not allowed	Allowed
Animal welfare requirements	Yes	No
Cows required to be on pasture for pasture season	Yes	No
Lower levels of environmental pollution	Yes	Not Necessarily
Audit trail from farm to table	Yes	No
Certification required, including inspections	Yes	No
Legal restrictions on allowable materials	Yes	No

Photo by: <https://www.ams.usda.gov>

Challenges – Limitations on usage

- ❖ **Silicone (dimethylpolysiloxane) limited to 10 ppm in most ready-to-eat foods**
- ❖ **Silicone Defoamers not allowed for Organic**
- ❖ **Many vegetable oil antifoams only practical limitation is GMPs**
- ❖ **Refer to 21 CFR 173.340**

Challenges – Marketing

❖ USDA Organic Certification

- ❖ Made with Organic, Organic, 100% Organic
- ❖ Canadian Food Inspection Agency (CFIA) reciprocity
- ❖ Nearly 80 Authorized Organic Certifying Agents
- ❖ <https://www.ams.usda.gov/sites/default/files/media/OrganicCertifyingAgents.pdf>
- ❖ Refer to National Organic Program 7 CFR 205.605



Photo by: <https://www.ams.usda.gov>

❖ Non-GMO Certifications

- ❖ e.g. Non-GMO Project Verification, Eurofins, True North, etc.

❖ Health Food Stores

- ❖ Most have prohibited or allowed ingredient lists

Challenges – Labeling

❖ Processing Aid vs. Food Ingredient

- ❖ Liquid antifoams sometimes considered processing aid
- ❖ Most powdered antifoams are ingredients and need to be labeled

❖ 21 CFR 101.100 Food; exemptions from labeling

- ❖ Many consider liquid antifoams to be exempt from labeling

Challenges – Labeling

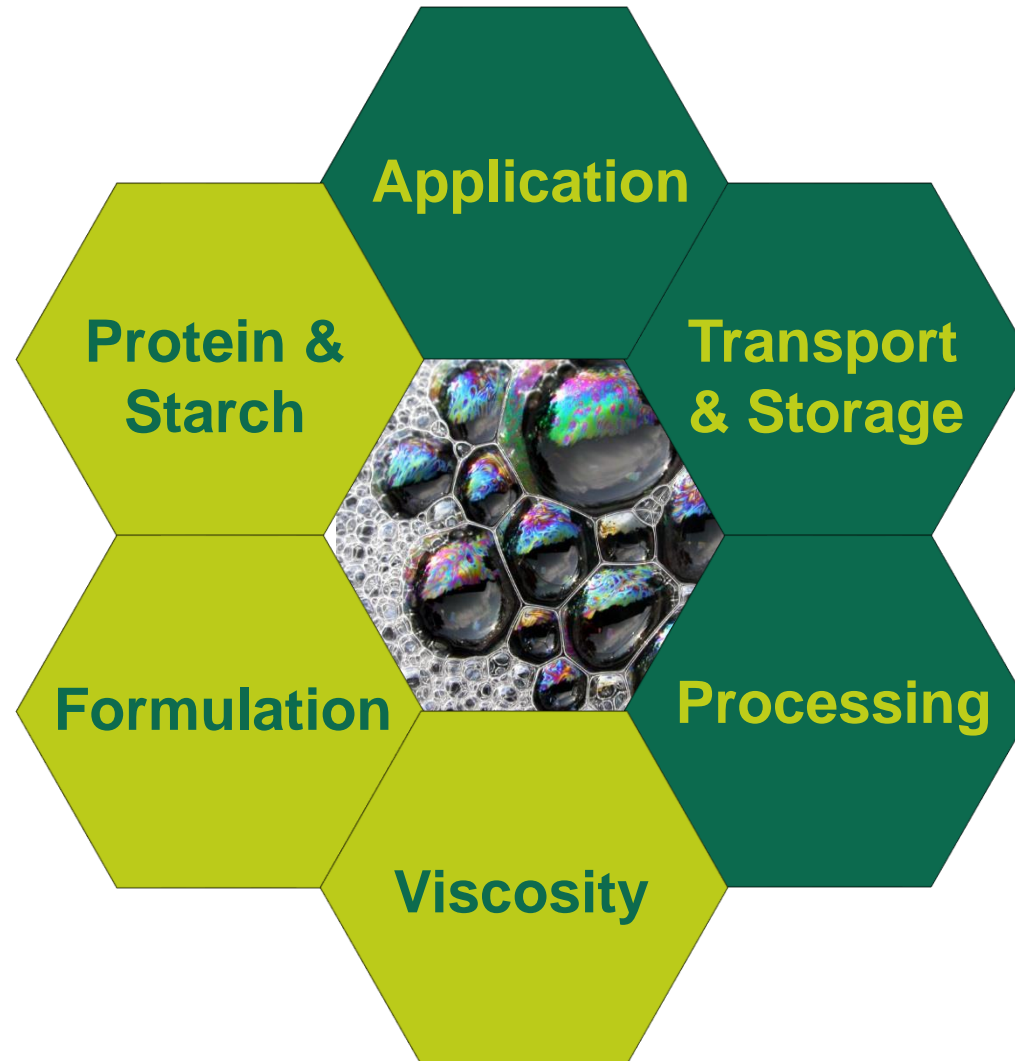
❖ Labeling regulations are complex

- ❖ Ultimately you must decide what to label
- ❖ Based on how and where antifoam is added

❖ Example of Carbonated Soft Drink Fountain Drink labeling:

Water, Caramel Color, Phosphoric Acid, Sodium Saccharin, Potassium Benzoate (To Protect Taste), Natural Flavors, Citric Acid, Caffeine, Potassium Citrate, Aspartame, Dimethylpolysiloxane.

Challenges – Defoamer Performance



Challenges – Selecting Right Product

- ❖ **Defoamers are Product/Application Specific**
- ❖ **What to consider:**
 - ❖ What is the Application?
 - ❖ Determine Finished Product Marketing Certifications/Claims
 - ❖ **Define “natural”**
 - ❖ **Define allowable or prohibited ingredients**
 - ❖ Pick a test method that replicates production process

Challenges – Storage and Usage

- ❖ General rule to add before foam occurs, where mixing is present
 - ❖ Think of boiling pasta on stove, what do you add to eliminate foam?
- ❖ Storage:
 - ❖ Over time defoamers will separate (thermodynamically favored)
 - ❖ Mixing 'before use' ensures homogeneity of the dispersion and thus product performance
 - ❖ Ensure good vortex, bigger and slower blades are preferable to smaller/faster blades
- ❖ Store as described by Manufacturer

Magrabar Antifoams & Defoamers

- ❖ **QAI Organic Certified & WSDA Organic Compliant Liquid & Powder Antifoams**
- ❖ **Non-GMO Project Verified Liquid and Powder Defoamers**
- ❖ **Conventional Liquid and Powder Defoamers**

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Thank you



Vielen Dank

