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:


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

<table>
<thead>
<tr>
<th>Formulation Pro</th>
<th>Protein RTD %</th>
<th>Formulation Protein Shake %</th>
<th>Formulation Oatmeal %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>80.485</td>
<td>Water</td>
<td>87.3</td>
</tr>
<tr>
<td>Whey Protein</td>
<td>14.1</td>
<td>Milk Protein</td>
<td>4.1</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>4.1</td>
<td>Whey Protein</td>
<td>2.15</td>
</tr>
<tr>
<td>Flavor</td>
<td>0.5</td>
<td>Sodium Caseinate</td>
<td>1.53</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>0.36</td>
<td>Cocoa Powder</td>
<td>1.5</td>
</tr>
<tr>
<td>Masking Flavor</td>
<td>0.3</td>
<td>Creamer</td>
<td>1.0</td>
</tr>
<tr>
<td>Caffeine</td>
<td>0.1</td>
<td>Flavor</td>
<td>0.85</td>
</tr>
<tr>
<td>Sucralose</td>
<td>0.04</td>
<td>Soluble Fiber</td>
<td>0.70</td>
</tr>
<tr>
<td>Color</td>
<td>0.004</td>
<td>Vegetable Oil</td>
<td>0.44</td>
</tr>
<tr>
<td>Magrabar Antifoam</td>
<td>0.01</td>
<td>Masking Flavor</td>
<td>0.25</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>Gum</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecithin</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sucralose</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carrageenan</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magrabar Antifoam</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formulation Pro</th>
<th>Protein RTD %</th>
<th>Formulation Protein Shake %</th>
<th>Formulation Oatmeal %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>87.3</td>
<td>Water</td>
<td>74.49</td>
</tr>
<tr>
<td>Oats</td>
<td>11.3</td>
<td>Oats</td>
<td>11.3</td>
</tr>
<tr>
<td>Cream</td>
<td>5.0</td>
<td>Cream</td>
<td>5.0</td>
</tr>
<tr>
<td>Dried Fruit</td>
<td>2.8</td>
<td>Dried Fruit</td>
<td>2.8</td>
</tr>
<tr>
<td>Sugar</td>
<td>2.5</td>
<td>Sugar</td>
<td>2.5</td>
</tr>
<tr>
<td>Whey</td>
<td>2.5</td>
<td>Whey</td>
<td>2.5</td>
</tr>
<tr>
<td>Food Starch</td>
<td>1.0</td>
<td>Food Starch</td>
<td>1.0</td>
</tr>
<tr>
<td>Omega 3</td>
<td>0.10</td>
<td>Omega 3</td>
<td>0.10</td>
</tr>
<tr>
<td>Cinnamon</td>
<td>0.10</td>
<td>Cinnamon</td>
<td>0.10</td>
</tr>
<tr>
<td>Sat</td>
<td>0.10</td>
<td>Sat</td>
<td>0.10</td>
</tr>
<tr>
<td>Flavor Extract</td>
<td>0.10</td>
<td>Flavor Extract</td>
<td>0.10</td>
</tr>
<tr>
<td>Magrabar Antifoam</td>
<td>0.01</td>
<td>Magrabar Antifoam</td>
<td>0.01</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th></th>
<th>Organic</th>
<th>Natural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic persistent pesticides</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>GMOs</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Growth hormones</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Sludge &amp; irradiation</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Animal welfare requirements</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cows required to be on pasture for pasture season</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lower levels of environmental pollution</td>
<td>Yes</td>
<td>Not Necessarily</td>
</tr>
<tr>
<td>Audit trail from farm to table</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Certification required, including inspections</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Legal restrictions on allowable materials</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Photo by: [https://www.ams.usda.gov](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
  ❖ Refer to National Organic Program 7 CFR 205.605

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

❖ Health Food Stores
  ❖ Most have prohibited or allowed ingredient lists

Photo by: [https://www.ams.usda.gov](https://www.ams.usda.gov)
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

- Application
- Transport & Storage
- Processing
- Viscosity
- Formulation
- Protein & Starch
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
Contact Information

Dr. Ravi G. Joshi
Business Development Director
6100 Madison Court
Morton Grove, IL 60053
Phone: +1 (847) 595-1810
Email: RJoshi@Munzing.US
www.munzing.com

Jennifer Dingman
Sales Director
1455 Broad Street, 3rd Fl.
Bloomfield, NJ 07003
Phone: +1 (989) 488-7085
Email: Jdingman@Munzing.US
www.munzing.com

Nader Mazloom
Mid-West Regional Sales Manager
1455 Broad Street, 3rd Fl.
Bloomfield, NJ 07003
Phone: +1 (989) 330-2189
Email: NMazloom@Munzing.US
www.Munzing.com
Thank you

Vielen Dank