BioVia® CL 600 Series Antimicrobials

USING MODERN TECHNIQUES TO IMPROVE YOUR PRODUCTS’ FOOD SAFETY HURDLES

Clean Label Conference, March 2016

Dave Horowitz – Director of Sales Strategic Initiatives
Agenda

- Definitions
- Antimicrobial Landscape
- BioVia® CL 600 Series
- Challenge Study Data
- How Is It Labeled?
- Applications
What Is Clean Label?

Minimally Processed

Found in the average kitchen

Sustainable

The New Natural

Healthy

Easily Understood

Nutritious
What Happens When We Take Out Chemical Preservatives?

- Staying away from the “ITES” and “ATES”
- Being Aware Of The New FSMA Regulations
- Improving Your Hurdle Technology
- Utilizing New Technologies To Hit The Bull's-Eye (WGS, Microbiomics)
<table>
<thead>
<tr>
<th>Chemical Preservative</th>
<th>Acid</th>
<th>Food Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Benzoate</td>
<td>Benzoic Acid</td>
<td>Cranberries, Plums, Prunes</td>
</tr>
<tr>
<td>Potassium Sorbate</td>
<td>Sorbic Acid</td>
<td>Berries</td>
</tr>
<tr>
<td>Calcium Propionate</td>
<td>Propionic Acid</td>
<td>Swiss Cheese</td>
</tr>
<tr>
<td>Sodium Diacetate</td>
<td>Acetic Acid</td>
<td>Vinegar</td>
</tr>
</tbody>
</table>
Factors Influencing Growth

- FORMULA INGREDIENTS
- pH
- MOISTURE
- HEAT
- MICROBIAL INTERACTION
- MODIFIED ATMOS.
- REFRIG. & STORAGE
- HURDLE TECHNOLOGY
Natural Antimicrobials as Hurdles

Substances that eliminate microorganisms or inhibit their growth

Examples:

• Organic acids
• Bacteriocins
• Antimycotics
• Others (plant extracts, essential oils, etc.)
Natural Food Protectants

- Metabolite Production
- Biomass Production
- Fermentates
- Purification
- Peptides (Bacteriocins)
- Organic Acids
- Other Molecules
- Concentration
- Protective Cultures

Fragments: R-COO-, R-COOH
Introducing BioVia® CL 600 Series

BioVia® CL 600  Uncured & Cured Meats

BioVia® CL 610  RTE Meals and Deli Salads

BioVia® CL 615  Hummus & Dips > Certified Organic

All are Kosher Pareve
BioVia® CL 600 Validation

Log\textsubscript{10} CFU/g *L. monocytogenes* Outgrowth/Reduction in Test 4 Antimicrobial Formulation of Uncured Turkey Loaf Over 90 Days of Refrigerated Storage
3% Lactate/Diacetate Validation

Log$_{10}$ CFU/g *L. monocytogenes* Outgrowth/Reduction in Test 9 Antimicrobial Formulation of Uncured Turkey Loaf Over 90 Days of Refrigerated Storage
BioVia® CL 610 Validation

*The Listeria monocytogenes challenge study was conducted by an independent laboratory.*
BioVia® CL 610 Validation

Chicken Salad: Shelf Life Study @ 7°C – Total Plate Count

- Control
- 1.0% BioVia™ CL-610
- 1.5% BioVia™ CL-610
Tuna Salad: *Listeria monocytogenes* Challenge Study @ 7°C

*The *Listeria monocytogenes* challenge study was conducted by an independent laboratory.*
How Can It Be Labeled?

All BioVia® CL 600 series antimicrobials contain:

Cultured Dextrose, Dried Vinegar -OR- Cultured Corn Syrup Solids, Dried Vinegar
FAQ

**QUESTION:** Will the BioVia® CL 600 have an affect on my product’s flavor?

**ANSWER:** It should have minimal effect. In some cases it can add a positive savory taste. Stop by the DuPont tabletop for further discussion.

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**QUESTION:** Does the BioVia® impart a cidal or stasis effect?

**ANSWER:** It may tend to show some bacteriocidal effects on lactics, but should also provide good stasis.

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**QUESTION:** What are the attributes which provide the BioVia® with its antimicrobial efficacy?

**ANSWER:** The naturally produced organic acids from fermentation along with bacteriocins provide a unique and effective clean label system.
Thank You

How Can We Help You Clean Up Your Label?

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 ABOUT DUPONT NUTRITION & HEALTH

DuPont Nutrition & Health combines in-depth knowledge of food and nutrition with current research and expert science to deliver unmatched value to the food, beverage and dietary supplement industries. We are innovative solvers, drawing on deep consumer insights and a broad product portfolio to help our customers turn challenges into high-value business opportunities.