Zemea® USP-FCC Propanediol

1. **Plant-based Flavor Modulator**
2. **Differentiated Performance Over PG & Glycerin**
3. **Processing aid**

Zemea® is a natural, plant-based alternative to petroleum-based glycols like Propylene Glycol (PG) and Glycerin for food & flavor formulators who desire a multifunctional and innovative ingredient that delivers high performance in a variety of consumer applications.

Based on trends to use more natural and sustainable ingredients and reduce sugar content, Zemea® USP-FCC propanediol may be a great option for your formulations!

**Functions of Zemea® USP-FCC**
- Flavor Carrier
- Solvent
- Humectant
- Processing aid
- Flavor Modifier
- Extraction solvent

**Benefits**
- Plant-based alternative to PG or glycerin
- Reduces bitterness and enhances sweetness
- Boosts bitter blocking efficacy
- Mitigates off-taste quality
- Lowers water activity and boosts preservative efficacy
- Differentiated solubility properties
- Less chemical and artificial tasting than PG
- Humectancy enhancement in baked goods
- Sustainability confirmed by Life Cycle Assessment

**Processing Aid**

1. **Flavor Solubilization**
   - Pre-mixing of solubilizer and flavor with humectant prior to introduction to water.

2. **Polymer Dissolution**
   - Premixing polymer with humectant prior to adding to water.
   - Improves dissolution and reduces clumping (fish eyes) in gums and rheology modifiers.

3. **Sweetener Incorporation**
   - Sweeteners are brought into solution much more rapidly when a sweetener carrier is used.
Zemea® USP-FCC Propanediol

Applications
- Baked Goods, Icing, Cream Fillings
- Beverages, Non-Alcoholic & Alcoholic
- Candy
- Confections and Frostings
- Condiments and Relishes
- Frozen Dairy Products
- Fruit Ices
- Gelatins and Puddings
- Processed Foods
- Seasonings and Flavors
- Soups
- Sweet Sauces
- Liquid Sweeteners
- Energy Shots & Drinks
- Coffee & Tea

Approvals & Certifications
- Food Chemicals Codex (FCC)
- United States Pharmacopeia (USP)
- Generally Recognized As Safe (GRAS)
- Flavor & Extract Manufacturers Association (FEMA # 4753)
- USDA BioPreferred Certified - 100% Bio-based (ASTM D6866)
- “Non-GMO Project” - Acceptable based on usage levels
- PCR negative – No GMO corn traits in final product
- Gluten-free
- Kosher
- Halal
- Vegan

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Unit</th>
<th>Value</th>
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<tbody>
<tr>
<td>Boiling Point</td>
<td>°C</td>
<td>214</td>
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<tr>
<td>Freezing Point</td>
<td>°C</td>
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<tr>
<td>Specific Gravity (20/20°C)</td>
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<td>1.053</td>
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<tr>
<td>Viscosity (20°C)</td>
<td>cP</td>
<td>49</td>
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<tr>
<td>Solubility (in Water 20°C)</td>
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<td>Completely Soluble</td>
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