Nature Mold Inhibitor

MP 100

Nature Mold Inhibitor

March 26-27, 2019

YANLING YIN

3/18/2019
CLEAN LABEL IS HERE TO STAY

NO ARTIFICIAL PRESERVATIVES
# Common Preservatives Used in Baked Goods

<table>
<thead>
<tr>
<th>Product</th>
<th>Active Ingredient</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium propionate</td>
<td>Propionic acid</td>
<td>Yeast-raised, tortillas</td>
</tr>
<tr>
<td>Sodium propionate</td>
<td>Propionic acid</td>
<td>Chemically leavened, pie fillings, tortillas</td>
</tr>
<tr>
<td>Potassium sorbate</td>
<td>Sorbic acid</td>
<td>Yeast-raised, chemically leavened, pie fillings, tortillas</td>
</tr>
<tr>
<td>Sodium diacetate</td>
<td>Acetic acid</td>
<td>Yeast-raised</td>
</tr>
<tr>
<td>Vinegar</td>
<td>Acetic acid</td>
<td>Yeast-raised</td>
</tr>
<tr>
<td>Raisin juice</td>
<td>Tartaric acid</td>
<td>Yeast-raised</td>
</tr>
<tr>
<td>Sodium benzoate</td>
<td>Benzoic acid</td>
<td>Pie fillings</td>
</tr>
<tr>
<td>Lactic acid</td>
<td>Lactic acid</td>
<td>Yeast-raised</td>
</tr>
</tbody>
</table>
Natural Mold Inhibitors

- Fermented Organic Acids
  - Cultured Wheat, Cultured Whey, Cultured Sugar, etc.

- Natural Occurring Acids from Fermentation
  - Acetic Acid (Vinegar), Tartaric Acid (Raisin Juice Conc.), Lactic Acid

- Natural Antimicrobial Compound in Plants
  - Cinnamon, Cloves, Mustard, Allspice, Bay Leaf, Caraway, Coriander, Cumin, Oregano, Rosemary, Sage, Thyme
Corbion’s been leading the industry in fermentation technology (nature solutions) since 1937

What started with

Looks like this today
Clean label mold inhibition requires a deep understanding on Microbiology and the use of different technologies

- Microbiology Screening
  - Full Screening and Insulation of the major microorganisms on bread molding:
    - Aspergillus niger
    - Penicillium corylophilum
    - Penicillium roqueforti

- Mold Inhibition
  - Use of current knowledge and development of new fermented solutions to fight mold spores:
    - Propionate Ferments
    - Special Vinegars
    - Vegetable extracts*
    - Mineral Salts*

- pH Control
  - Selection of most effective and clean label pH control solutions that can work in synergy with Mold inhibitors:
    - Vinegar
    - Lactic Acid
    - Etc
Bio Screening – Efficacy of Ingredients & Effect pH, $a_w$, T

Dose-response curves can be used to predict the efficacy of combinations of several hurdles and ingredients.
Synergy between Corbion Vinegar Powder and Nature Ferments

**P. roquefortii**

**Corbion Nature Ferment**

**Vinagar Powder**

![Graph](image)
Mold Inoculation Testing

- Cocktail of Mold Spores Grown and Isolated
  - Aspergillus Niger
  - Penicillium Corylophilum
  - Penicillium Roqueforti
- Inoculated onto fresh bread
  - 10 points of inoculation / loaf
  - 10 loaves / variable
  - 100 points of data / test variable
- Double Bagged and Heat Sealed
  - Eliminating potential for outside contamination
- Hold for Mold Growth
  - Once all 10 inoculation points have shown mold, loaf is considered at “failure”
Bread Inoculation Study - Average Days to Mold Failure

- No Preservatives: 6 days
- Cultured Wheat Flour: 16 days
- Cultured Whey: 11 days
- Cultured Sugar: 14 days
- Vinegar Powder: 13 days
- Cultured Sugar/Vinegar Powder: 16 days

*Variables used 0.5% 200gr Distilled White Vinegar as pH Control*
Sensory Results

- Verdad MP 100 statistically significantly better Aroma
- No statistical difference in Flavor
- When asked to rank the samples from 1 to 4, 78% of panelists ranked Verdad MP 100 their first or second choice.
Commercial Validation – High Fiber Pan Bread

<table>
<thead>
<tr>
<th></th>
<th>Cultured Wheat Flour</th>
<th>Verdad MP 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>200gr Vinegar</td>
<td>2.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Total</td>
<td>8.0%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Average Days to Mold
Date of Run: 3-7-18
Commercial Validation – Hot Dog Buns

<table>
<thead>
<tr>
<th></th>
<th>CalPro</th>
<th>Verdad MP 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>38.43%</td>
<td>38.23%</td>
</tr>
<tr>
<td>Water Activity</td>
<td>0.945</td>
<td>0.9376</td>
</tr>
<tr>
<td>pH</td>
<td>5.56</td>
<td>5.56</td>
</tr>
<tr>
<td>TTA</td>
<td>0.19</td>
<td>0.27</td>
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</tbody>
</table>
Corbion MP100

Effective nature mold inhibitor

Excellent functionality and flavor profile

Clean label solution
THANK YOU!