Beverage manufacturers tailor beverages to meet their customers lifestyle – at LANXESS we tailor the corresponding beverage protection. Nagardo™ is the natural guardian to secure and prolong the shelf life of your beverage. Safety enabled by nature.
Soft drinks come with a promise of refreshment and drinking pleasure. But the most important promise to consumers is their safety when enjoying a beverage. Nagardo™ natural beverage protection helps manufacturers to keep this promise by naturally protecting their products from spoilage. Safety enabled by nature.

**NAGARDO™**
**THE NATURAL GUARDIAN FOR BEVERAGE QUALITY**

Nagardo™ is obtained as a purified mixture of glycolipids. The source organism is an edible jelly fungus called *Dacryopinax spathularia* which grows in (sub-)tropical climates. A proprietary wild-type strain (not genetically modified) is cultivated using renewable raw materials. Pure Nagardo™ is recovered by a food grade and solvent-free process based on filtration and precipitation, without chemical modification.

**BENEFITS**
- Natural beverage protection that allows new marketing opportunities
- Efficient control of a broad range of spoilage organisms
- Pure sensory experience
- Broad application in various soft drink formulations
- Easy integration into existing production processes

**NEW OPPORTUNITIES FOR BEVERAGE MANUFACTURERS**
- Consumer friendly labeling
- Natural claims (depending on legislation)
Nagardo™ is up to 50 times more efficient than chemical preservatives

Nagardo™ natural beverage protection shows very good efficacy against typical beverage spoiling microorganisms including yeasts, molds and bacteria. In addition, it controls microorganisms that have adapted or are less sensitive to currently used preservatives. It works by interacting with the microbial cell membrane and is chemically stable at a pH range between 2.5 to 7 (it is most effective within a pH range of 2.5-4.6).

Tailored dosage is key - the recommended dosage needs to be determined individually for each beverage. We support you in finding the optimal quantity to receive reliable antimicrobial protection at balanced costs.

Efficacy data against microorganisms*
Minimum inhibitory concentrations of Nagardo™; inoculation of >500 CFU/mL.

<table>
<thead>
<tr>
<th>Yeast</th>
<th>MIC Nagardo™ [mg/L]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saccharomyces cerevisiae</td>
<td>3.1</td>
</tr>
<tr>
<td>Zygosaccharomyces bailii</td>
<td>3.1</td>
</tr>
<tr>
<td>Zygosaccharomyces rouxii</td>
<td>6.3</td>
</tr>
<tr>
<td>Candida parapsilosis</td>
<td>6.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mold</th>
<th>MIC Nagardo™ [mg/L]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillium roqueforti</td>
<td>12.5</td>
</tr>
<tr>
<td>Trichoderma virens</td>
<td>6.3</td>
</tr>
<tr>
<td>Aspergillus brasiliensis</td>
<td>6.3</td>
</tr>
<tr>
<td>Byssochlamys nivea</td>
<td>12.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>MIC Nagardo™ [mg/L]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetobacter aceti</td>
<td>50</td>
</tr>
<tr>
<td>Acetobacter pasteurianus</td>
<td>6</td>
</tr>
<tr>
<td>Lactobacillus brevis</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Lactobacillus plantarum</td>
<td>&lt;3.9</td>
</tr>
</tbody>
</table>

* Information only. Efficacy data are approximate values and are not considered part of the product specifications.

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**PURE SENSORY EXPERIENCE**

Nagardo™ gives manufacturers full control over the sensory experience of their beverage

Nagardo™ natural beverage protection is taste neutral at recommended concentrations and has no effect on the color. It does not interfere with the sensory experience you desire for your customer.
- Taste neutral
- No influence on color

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**BROAD APPLICATION**

The application scope of Nagardo™ covers various soft drinks*

- Chemically stable at pH range between 2.5 to 7, most efficacious within pH 2.5-4.6
- Nagardo™ powder shows good water solubility
- Non-GMO
- Free of known allergens
- GRAS status (US FDA)

**RANGE OF BEVERAGES**

- Carbonated & still soft drinks
- Isotonic sports drinks
- Ready to drink teas
- Flavorized waters
- Energy drinks
- And many more

* As with any product, use of Nagardo™ in a given application must be tested (including field testing, etc.) by the user in advance to determine suitability.
EASY PROCESS INTEGRATION

Nagardo™ can be handled like most other beverage ingredients in powder form. It does not require changes to the typical process or even the filling line.

- Easy application as aqueous stock solution at any stage of the production process
- Stable as powder
- Stable in typical beverage processing steps, including flash pasteurization and UV treatment
- No packaging restrictions
- No CAPEX investment needed
- Cost efficient
- Safe to handle

ALWAYS ON HAND

Our specialists are always on hand to provide detailed advice and comprehensive support for everything related to the use of Nagardo™ natural beverage protection:

- Advise on the application of Nagardo™
- Support in laboratory and production testing
- Plant assessment
- Regulatory support

What can we do for you? We look forward to each new challenge – and our next conversation with you!

Sales contact: nagardo@lanxess.com
www.nagardo.com
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