Nature’s best just got better

Food manufacturers looking to move from synthetic chemical preservatives to more natural alternatives have found an increasing number of viable options in recent years. But until now, these natural solutions have approached food protection challenges only through free radical scavenging, missing out on the advantages of metal chelation.

Now DuPont introduces GUARDIAN™ CHELOX L, a unique, patent-pending blend of natural plant extracts that combines strong metal chelation and free-radical scavenging into food emulsions, taking the best in natural antioxidants to a new level of effectiveness. GUARDIAN™ CHELOX L gives the makers of food emulsions, such as mayonnaise, dressings, margarine and spreads a value-adding natural alternative to EDTA, which has long been the industry’s traditional, synthetic chelator.

Product Benefits:

- Synergistic antioxidant protection of food emulsions
- Natural alternative to synthetic antioxidants and chelators
- Clean, friendly labeling
- Consistent product quality
- Easy to handle and apply
- Low color / flavor impact
- All components are GRAS

GUARDIAN™ CHELOX L:
Finally, a strong metal chelator that’s natural

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Introducing GUARDIAN™ CHELOX L

Introducing GUARDIAN™ CHELOX L, part of the DuPont™ Danisco® ingredient range, manufacturers can create products that respond to continuing consumer demand for products with cleaner, friendlier ingredient labels and still achieve the shelf life they need to stay competitive.

Using Electron Spin Resonance (ESR) spectroscopy, Danisco has developed highly sensitive methods for detecting metal chelating and radical scavenging activity of plant extracts. This technology proved invaluable in our discovery of the synergistic interaction between specific plant extracts that makes GUARDIAN™ CHELOX L such an effective inhibitor of lipid oxidation and rancidity in foods.

This synergistic primary/secondary antioxidant activity gives processors a viable alternative to using such traditional, synthetic antioxidants as EDTA, BHA and BHT. By removing what many consumers see as “chemical” preservatives, food manufacturers can respond to a previously unmet need in the market – a natural, label-friendly product with an extended shelf life.

Manufacturers’ challenges

Maximizing product shelf life is a key consideration for any food manufacturer, but for makers of food emulsions, inhibiting food spoilage naturally brings unique challenges. Because these products tend to contain higher levels of fat, they also contain free radicals and metal ions which promote oxidation and lead to rancidity and shorter shelf life.

Natural, primary antioxidants help delay oxidation by scavenging free radicals, but without a natural metal chelator, natural food protection solutions in these products have been incomplete. Consequently, producers of most emulsified foods have had to rely on EDTA, a synthetic antioxidant, to achieve the extended shelf life they need, although at the expense of the “natural” or “no artificial preservatives” claim many consumers seek.
Margarine / Fat Spreads

Because margarine and spreads have a high susceptibility to lipid oxidation, these are important application areas for GUARDIAN™ CHELOX L, which effectively retards the reaction between fat and oxygen. Shelf life testing of both 60% and 40% fat spreads was conducted to compare the antioxidant activity of two dosages of GUARDIAN™ CHELOX L (300ppm and 600ppm) against 150 ppm EDTA and a control containing no antioxidant solution.

Tests measured the amount of hexanal – a major secondary product formed during lipid oxidation – in the 60% fat spread at 39-40°F (~4°C) over a 12-month period. As shown in figure 1.1 below, the performance of the sample made with 600ppm GUARDIAN™ CHELOX L was similar to that of the sample containing EDTA.

Similar tests were conducted in 40% fat spreads using 250ppm and 500ppm GUARDIAN™ CHELOX L, 75ppm EDTA and a control containing no antioxidant solution. Figure 1.2 below shows levels of 2,4-heptadienal, an aldehyde produced in the breakdown of unsaturated lipids. Both samples containing GUARDIAN™ CHELOX L demonstrated antioxidant activity similar to EDTA.

Mayonnaise & Dressings

The synergistic, two-part antioxidant activity provided by GUARDIAN™ CHELOX L is well-suited to mayonnaise and dressing applications, which benefit from the blend’s radical scavenging and metal chelating properties.

In real mayonnaise, GUARDIAN™ CHELOX L chelates iron and scavenges radicals released by egg yolks at low pH. Shelf life testing of 80% fat mayonnaise compared samples containing various levels of GUARDIAN™ CHELOX L (500ppm, 750ppm, 1000ppm) against samples using 75ppm EDTA or no antioxidants at all. GUARDIAN™ CHELOX L inhibited the formation of 2,4-heptadienal (which contributes to off-flavors), achieving a level of antioxidant protection close to that in the EDTA sample. (See Figure 2.1 below.)

Tests on samples of 40% fat ranch dressing were conducted using 800ppm and 1000ppm GUARDIAN™ CHELOX L, 75ppm EDTA and no antioxidants. The samples were stored at 77°F (25°C). Measuring hexanal content over a 12-month period, test results showed antioxidant protection in the samples containing GUARDIAN™ CHELOX L similar to that seen in the EDTA sample. (See Figure 2.2 below.)
Your gains and benefits

Without an effective natural chelator to turn to, manufacturers have traditionally felt compelled to rely on synthetic preservatives such as EDTA to achieve the shelf life they need to be competitive. Now, GUARDIAN™ CHELOX L enables them to maintain the freshness of their mayonnaise, dressings, margarine and spreads in a natural, label-friendly way that’s pleasing to consumers, allowing them to be more competitive than ever.

<table>
<thead>
<tr>
<th>Product Feature</th>
<th>Your Business Gain</th>
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<tbody>
<tr>
<td>Multi-component antioxidant blend</td>
<td>Synergistic antioxidant activity that maximizes natural shelf life extension</td>
</tr>
<tr>
<td>Contains clean-label ingredients</td>
<td>Improves consumer appeal and expands addressable market</td>
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<tr>
<td>Non-GMO Halal &amp; Kosher certification</td>
<td>Supports broader consumer acceptance / expands addressable market</td>
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<tr>
<td>Sustainable supply</td>
<td>Stable, reliable supply chain</td>
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<tr>
<td>Naturally-produced components</td>
<td>Meets consumer demand for natural, sustainable ingredients; increases value for manufacturers</td>
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<td>Low color, low flavor impact</td>
<td>Ease of formulation</td>
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Contact DuPont to learn more about how you can use GUARDIAN™ CHELOX L to broaden the consumer appeal of your products, achieve your goals for product shelf life, and protect your brand reputation for reliable quality.

Care4U™ Food Protection

DuPont™ Danisco® food ingredients now encompass GUARDIAN™ CHELOX L as part of our Care4U™ range of natural protective solutions, which also includes MicroGARD® fermentates, NovaGARD® and BioVia™ antimicrobial blends, Nisaplin® and Natamax® natural antimicrobials, HOLD Bac™ and other protective cultures, and other GUARDIAN™ natural extracts.

The Care4U™ range of natural food protection solutions, reinforced by DuPont Qualicon science-based pathogen detection and microbial monitoring systems, together help companies protect their products, productivity and brands. For more information, or to contact a DuPont Nutrition & Health representative for assistance with a specific formulation, visit www.daniscoCARE4U.com.

About DuPont Nutrition & Health

DuPont Nutrition & Health addresses the world’s challenges in food by offering a wide range of sustainable, bio-based ingredients and advanced microbial diagnostic solutions to provide safer, healthier and more nutritious food. Through close collaboration with customers, DuPont combines knowledge and experience with a passion for innovation to deliver unparalleled customer value to the marketplace.

About DuPont™ Danisco®

DuPont™ Danisco® is the brand for a range of products that help provide enhanced bioprotection, an improved nutritional profile, and better taste and texture with greater cost efficiency and lower environmental impact, meeting the needs of manufacturers of food and beverages, dietary supplements and pet food. Through the work of the global network of food scientists and technologists in DuPont, the Danisco® range is supported by a uniquely broad spectrum of know-how across applications and processing.

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