

# Natural Food Protection





# Improve Shelf Life and Safety with Kalsec® — an Innovator in Natural Food Protection.

Kalsec pioneered the natural food protection landscape decades ago when our scientists used rosemary extract to extend the shelf life of food. Since then, we've perfected natural alternatives to synthetic antioxidants while expanding our natural food protection offerings to include antimicrobial blends. These blends provide **2-in-1 protection** against both oxidation and microbes.

Kalsec Natural Food Protection solutions balance scientifically proven functional efficacy, flavor and aroma management systems that ensure the highest quality solutions that protect your brand.

## Why choose Kalsec's Natural Food Protection for your products?

- ▶ More than 30 years of experience in natural shelf-life extension of food and expert applications support.
- ▶ Kalsec's vertical integration of rosemary extract helps deliver performance and consistency in protecting against oxidation.
- ▶ Optimized antioxidant and antimicrobial blends, developed through proprietary processing, rival performance of synthetic preservatives.



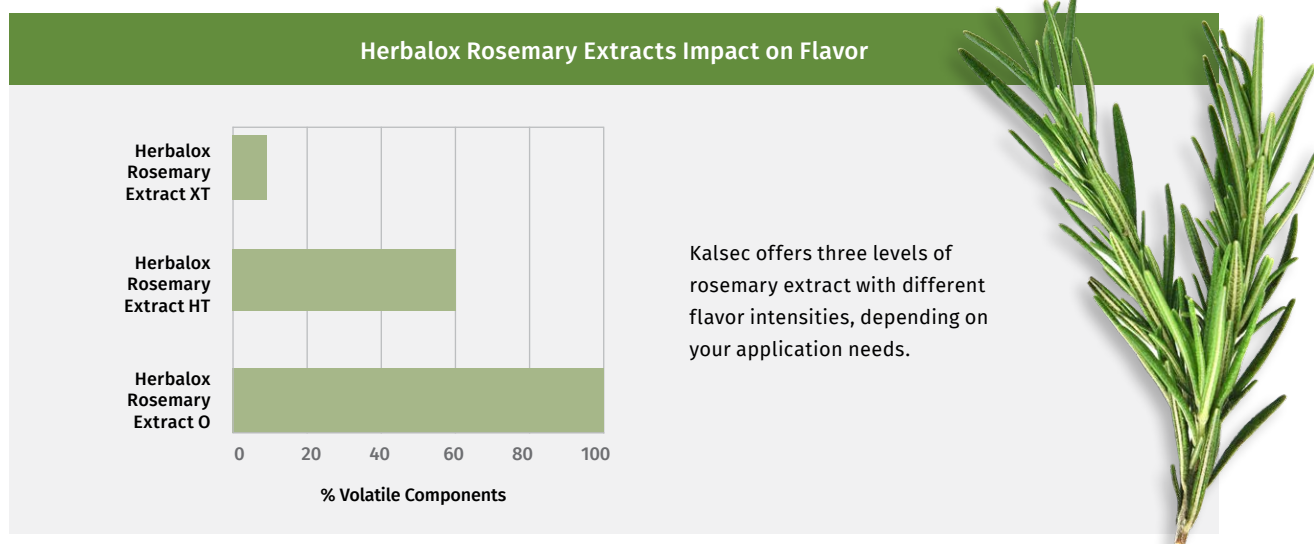
# Antioxidants Crafted by Kalsec™ —

## Making food look better, taste better and last longer—naturally®.



For more than 30 years, Kalsec has been a leader in the extraction and standardization of rosemary, a preferred ingredient in natural antioxidant solutions. With vertically integrated crops in the U.S. and relationships with select farmers throughout the world, we guarantee a consistent and high-quality supply for all our rosemary extracts.

**Herbalox® Rosemary Extract** established the standard for natural oxidation control, creating the foundation for label-conscious ingredients. Herbalox is standardized for antioxidant performance and available in three flavor levels, from zero impact to a hint of rosemary. In addition to excellent oxidation control, Herbalox offers the potential to act as a flavor modulator in certain unique applications.



Additionally, we offer **Duralox® Oxidation Management Systems**, which utilize a combination of potent naturally sourced ingredients that can match synthetic antioxidant performance. These systems can be formulated to include Herbalox, green tea, acerola, mixed tocopherols, citric acid, ascorbic acid and others to provide a synergistic effect for managing oxidation.

Kalsec's antioxidant solutions come in a range of solubilities and forms designed to meet our customers' needs.

Solubility and Form Options for Kalsec Antioxidant Solutions		
	Water Soluble	Oil Soluble
Liquid	✓	✓
Dry	✓	✓



# Kalsec Antimicrobial Blends —

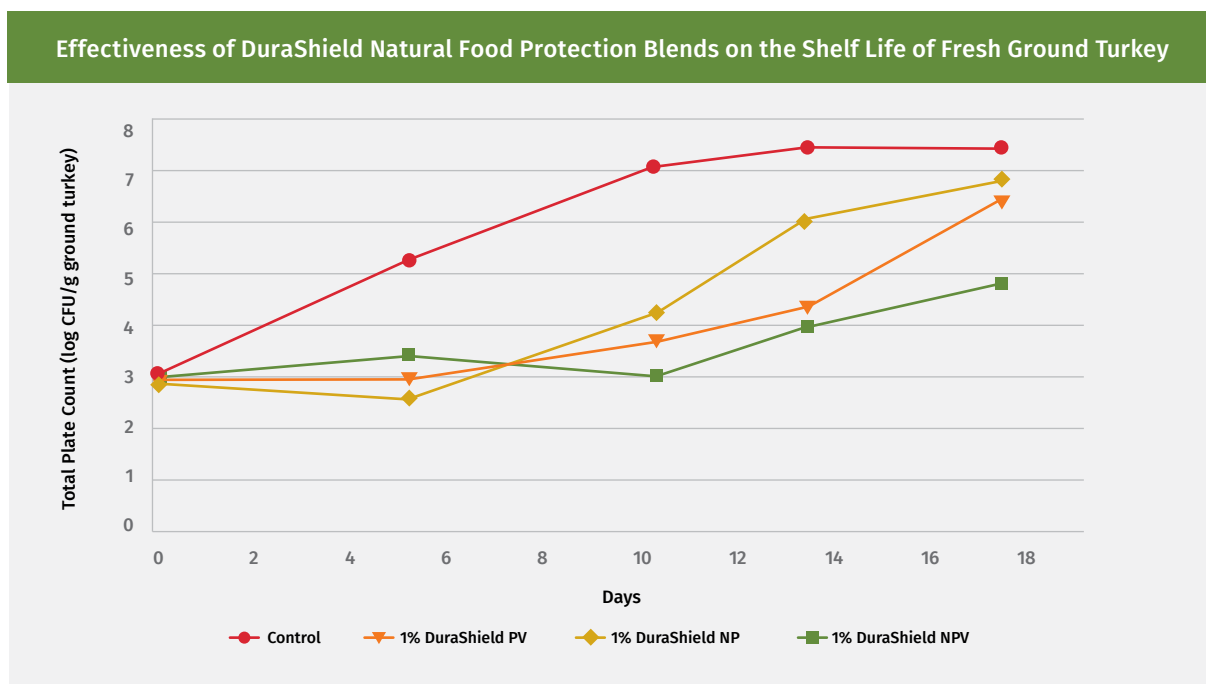
## Proven efficacy from the food protection experts.

A leading innovator in the field of food protection, Kalsec scientists discovered novel ways to combine natural antioxidants with the added benefits of antimicrobials. What they found was that when combined, the benefits of the individual components increased shelf life—providing synergies where 1+1>2.

**DuraShield™ Natural Food Protection Blends** improve shelf life and safety by combining traditional antioxidant products (including rosemary and acerola extracts) with natural antimicrobial products including cultured dextrose and/or buffered vinegar. They help maintain a cleaner, consumer-preferred label with minimal impact on taste and aroma.

DuraShield has been scientifically proven to limit the growth of both gram positive and gram negative bacteria, yeast, molds and common pathogens, such as *Listeria*, *E. coli* and *Salmonella* for safer products you can trust.

One of many studies conducted by Kalsec's microbiology lab examined the effectiveness of DuraShield on the shelf life of fresh ground turkey. Three different blends outperformed the control sample over the course of 17 days, with DuraShield NPV (a blend of rosemary, cultured dextrose and buffered vinegar) proving to be the most effective.



Our team of scientists is ready to partner with you to find the solution that works best for your application and labeling needs.

This publication was prepared utilizing Kalsec's own research and development work and is reliable and accurate to the best of Kalsec's knowledge. However, potential users of DuraShield Food Protection Blends should conduct their own research and tests to determine the suitability as well as the regulatory allowability DuraShield Food Protection Blends in their own application. The representations made in this publication are not to be considered as a warranty and will not support a claim for damages of any kind. Potential users of DuraShield Food Protection Blends should confirm, possibly by conducting additional research and testing, that the DuraShield Food Protection Blend functions as an antimicrobial in their specific application/s and confirm that the DuraShield Food Protection Blend is used consistent with regulatory requirements for their specific application/s.

# Technical Resources for Application Integration.

When you work with Kalsec Natural Food Protection ingredients, you get the added benefit of our team of scientists. Kalsec has the following resources available to support our customers:

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**Shelf Life Studies**—Temperature-controlled storage units and rapid oxidation tests, like the oxidative stability index (OSI) and Oxipres™, demonstrate the efficacy of Kalsec Natural Food Protection solutions.

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**Analytical Testing**—High performance liquid chromatography (HPLC) confirms the precise dosing of Natural Food Protection solutions, while gas chromatography (GC) monitors oxidation in applications over time.

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**Sensory Testing**—Our highly trained sensory panel uses industry-recognized analysis methods and translates the data into customer experiences.



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**Protein Innovation Lab**—Focuses on performance testing of fresh, cured, marinated and alternative protein applications.

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**Biosafety Level-1 (BSL-1) and Biosafety Level-2 (BSL-2) Labs**—Equipped to conduct shelf-life studies and microbial identification on both spoilage microorganisms and pathogens.

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**Traditional Microbial Culture and Advanced Molecular Biology Tools**—To perform microbial challenge studies in various food applications.



# *Kalsec's natural food protection experience is broad and comprehensive.*

Our application expertise includes:

- ▶ Meat, Poultry and Seafood
- ▶ Fats and Oils
- ▶ Baked Goods and Cereals
- ▶ Nuts
- ▶ Snacks
- ▶ Dairy
- ▶ Soups and Sauces
- ▶ Dressings
- ▶ Dips and Hummus
- ▶ Deli Salads
- ▶ Plant Based Proteins



## *Clean and Clear Labels from a Sustainable, Responsible Origin.*

From plant to extract, our natural food protection ingredients are sourced to deliver the highest quality and consistency available in the industry. These ingredients are non-GMO and can help achieve cleaner labels. Certified organic options are also available.

As a B Corporation™, Kalsec meets the highest verified standards of social and environmental performance, transparency and accountability to build a more inclusive and sustainable economy.





## Crafted by Kalsec™

Our expertly crafted ingredients combine naturally sourced materials with insights and technical expertise. This unique combination has positioned us as the trusted partner food and beverage manufacturers turn to for quality, reliability and consistency. Whether it is snacks, beverages, bakery, meat and poultry or sauces and dressings, we are your partner for creating innovative solutions to food and beverage challenges.

To learn more, visit [kalsec.com](https://www.kalsec.com).



kalsec®

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