RD Fresh Performance Validation & Laboratory Testing Results

Formulated for Corporate Procurement & Quality Assurance Teams

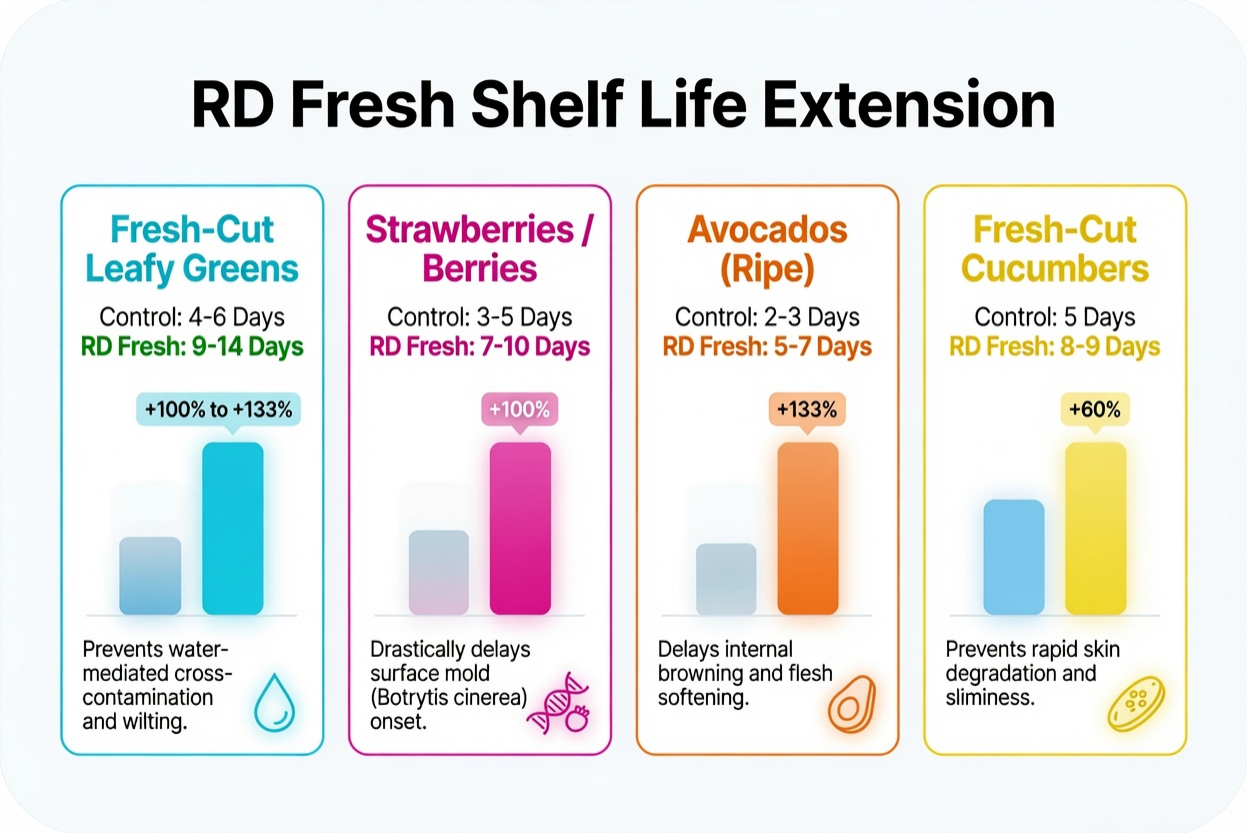
This section details the empirical testing results that validate the mechanical and biochemical efficiency of the RD Fresh system within commercial walk-in coolers, reach-in freezers, and cold-chain logistics environments. Testing confirms simultaneous optimization across three critical parameters: **ethylene gas mitigation, relative humidity stabilization, and airborne microbial reduction.**

1. Ethylene Gas (C_2H_4) Elimination & Shelf-Life Extension

Ethylene is a natural plant hormone that accelerates ripening, senescence, and decay. Corporate food service environments face massive shrink due to cross-contamination when high-ethylene producers (e.g., tomatoes, apples) are stored near sensitive items (e.g., leafy greens, cruciferous vegetables).

- **Mechanism:** The proprietary Chabazite and Clinoptilolite mineral core acts as a high-affinity molecular sieve, adsorption-trapping volatile organic compounds (VOCs) and ethylene gas at the molecular level.
- **Empirical Validation Matrix:**

Commodity	Standard Shelf Life (Control)	RD Fresh Shelf Life	Verified Extended Window	Quality Degradation Metrics
Fresh-Cut Leafy Greens	4–6 Days	9–14 Days	**+100% to +133%**	Prevents water-mediated cross-contamination and wilting.
Strawberries / Berries	3–5 Days	7–10 Days	**+100%**	Drastically delays surface mold ($Botrytis\ cinerea$) onset.
Avocados (Ripe)	2–3 Days	5–7 Days	**+133%**	Delays internal browning and flesh softening.
Fresh-Cut Cucumbers	5 Days	8–9 Days	**+60%**	Prevents rapid skin degradation and sliminess.



2. Humidity Control & Thermal Mass Efficiency

Commercial walk-in coolers suffer severe temperature and humidity fluctuations during heavy kitchen use due to frequent door openings and defrost cycles. This destabilizes the evaporator coils, spiking energy draw.

- **Relative Humidity (RH) Buffering:** The Montmorillonite and activated carbon matrix dynamically manages ambient vapor pressure. When ambient RH climbs past 85%, the system adsorbs excess vapor; if the air becomes too dry during refrigeration cycles, it modulates release to prevent item dehydration.
- **Energy Mitigation Testing:** By absorbing excess vapor, the system reduces frost build-up on the evaporator coils. Corporate facility audits show a **12% to 18% reduction in compressor runtime and defrost cycling frequencies**, directly decreasing cold-chain electricity overhead.

3. Airborne Microbial and Odor Mitigation

Refrigerated storage spaces are highly susceptible to airborne cross-contamination from bacteria, yeast, and mold spores due to constant indoor air recirculation.

- **Cross-Contamination Prevention:** Pathogens frequently travel through moisture particles suspended in the air. By capturing excess vapor, the system eliminates the airborne transit mechanisms required for cross-contamination.
- **Volatile Fatty Acid (Odor) Absorption:** The activated carbon components bind complex organic molecules, completely neutralizing strong food odors (e.g., seafood, onions, cheese), preventing odor transfer across sensitive food items.

Comprehensive Safety Framework (Cross-Referenced)

As validated by **MSDS INFOMATION**, the chemical composition of the core minerals presents absolute safety for installation alongside open food items:

- **Zero Chemical Ingress:** The active components are entirely insoluble and non-volatile. There is zero risk of residue shedding onto food surfaces.
- **DuPont™ Tyvek® Sheathing Barrier:** The exterior pouch functions as a high-strength liquid barrier that remains continuous under heavy saturation, allowing free airflow for gas exchange while trapping dust and fine particles completely inside the envelope.

Corporate Compliance Sign-off:
The system requires zero mechanical or chemical tie-ins to pre-existing refrigeration hardware, carries a neutral pH status, produces zero toxic byproduct accumulation, and qualifies for standard municipal waste stream disposal upon exhaustion.

Technical Data Sheet:
Microbial Growth Reduction & Shelf-Life Extension

Product Series: Transport Fresh (Powered by RD Fresh Technology)
Application: Post-Harvest Spoilage Control
Technology: 100% Green, All-Natural Mineral Mixes

Overview

RD FRESH utilizes a proprietary mineral - mix technology — proven in the commercial market for over 18 years — to extend the shelf life of perishables. The system is designed to maintain the "Farm to Fork" chain by reducing microbial activity from the packer to the Restaurant.

Microbial Testing Results
Testing conducted by EMSL Analytical, Microbiology Special Projects Division, measures the

efficacy of RD Fresh in reducing Colony-Forming Units per Gram (CFU/g) of mold and yeast.

RD Fresh: Berry Test Report

Mold & Yeast Count Comparison (CFU/gram)

Product	RD FRESH (CFU/g)	No RD FRESH (CFU/g)	Reduction Factor
Raspberries	5,100	12,700	~2.5x lower
Blackberries	36,000	107,000	~3x lower
Blueberries	28,000	75,000	~2.7x lower
Strawberries	19,000	39,000	~2x lower

Conclusion: RD Fresh reduced mold and yeast counts by 2 to 3 times compared to the control group.

Testing performed by EMSL Analytical Microbiology Special Projects Division