



GEOPHAGE BIOTECH

NATURE'S SHIELD AGAINST BACTERIA

SalmoRid™



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Introduction

SalmoRid™

SalmoRid™ is an antimicrobial preparation for controlling the food borne bacterial pathogen *Salmonella spp.* The active ingredients of **SalmoRid™** are naturally occurring lytic bacteriophages that selectively and specifically kill *Salmonella*, including strains belonging to the most common / highly pathogenic serotypes Typhimurium, Enteritidis, Heidelberg, Newport, Hadar, Kentucky, Thompson, Georgia, Agona, Grampian, Senftenberg, Alachua, Infantis, Reading, and Schwarzengrund. **SalmoRid™** is specifically designed for treating foods that are at high risk for *Salmonella* contamination. Poultry and seafood in particular can be treated prior to packing for significant reductions in *Salmonella* contamination.

SalmoRid™ is an all natural product. This product has been formulated to be suitable for Kosher, Halal, and OMRI certification as an ingredient for organic food production. Certification is pending.

Bacteriophages

Bacteriophages (or phages) are nature's way of destroying bacteria. A bacteriophage is a virus that is harmless to humans, animals, and plants but is very effective in killing bacteria. Specific phages kill specific bacteria. Bacteriophages are *the* most ubiquitous organisms on Earth, with their numbers estimated to be in the $10^{30} - 10^{32}$ range. They are naturally occurring and are commonly found almost everywhere, including in the water we drink and fresh foods we eat.

Bacteriophages provide an all-natural, nontoxic, safe and effective means for significantly reducing or eliminating disease-causing bacteria that are sometimes present in foods or in food processing environments. For example, for direct food applications, the approach of using phage-containing food safety products is based on adding the appropriate concentration of lytic bacteriophages active against the pathogenic bacteria contaminating the foods. If the foods are contaminated with pathogenic bacteria targeted by the bacteriophage preparations, the phages will eliminate or significantly reduce the concentrations of those bacteria in the foods, thus making them safer to eat.

GeoPhage has developed **SalmoRid™**, a bacteriophage-based product that targets *Salmonella spp.* **SalmoRid™** is *the* choice for eliminating or significantly reducing contamination of food with specific pathogenic bacteria because it:

- Is effective under a wide range of food storage conditions (e.g. 2°C – 42°C).
- Is all natural and not genetically modified (non-GM).
- Does not contain preservatives.
- Does not alter food flavor, aroma, or nutritional value.
- Does not contain any known, potentially-allergenic substances.
- Is cost effective and cost competitive.



Product Information

SalmoRid™ is a unique and proprietary blend of six individual lytic phages that provide broad protection against pathogenic strains of *Salmonella enterica*. **SalmoRid™** is a clear-to-opalescent, odorless liquid with a pH of 7.0 - 7.5.

SalmoRid™ significantly reduces (by as much as 95-100% in some cases) contamination levels of its targeted, susceptible *Salmonella spp.* strains in various foods.

SalmoRid™ is an all-natural product. It does not contain known allergenic substances (wheat, milk, soy, etc.) and it does not alter the general composition, taste, aroma, or color of foods.

SalmoRid™ is non-corrosive to processing equipment, requires low upfront investment in machinery and is cost competitive when compared to alternative technologies.



Application

SalmoRid™ is marketed as a concentrated, aqueous, phage preparation that must be stored refrigerated (2-6°C) and then diluted with clean, chlorine-free water prior to application. The packaging is labeled with clear instructions for use. Use instructions are laminated and can be easily displayed in the food-processing environment (e.g. attached to the walls in the food processing plant).

An industrial sprayer may be required for large direct applications. If food process requires dip treatment then that would be a ideal stage where phages can be applied. In cases of smaller bench-scale food applications, a handheld



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sprayer may be appropriate. These can be purchased directly from market and concentrates can be aliquoted in the doses for each applicator.

- For direct food applications, the diluted working solution is typically applied directly on food surfaces by spraying at a concentration of 1 - 4 mL of per pound of food product.
- For dip treatment solution add 1-5 mL of diluted working solution in 1 liter of dip treatment solution

GeoPhage Biotech works closely with all customers to identify the optimal intervention spots and treatment regimens for each individual customer/ production facility and provides an ongoing assistance with product use and applications.

Composition and Production

SalmoRid™ contains six distinct, individually purified phages specifically lytic to *Salmonella Spp.* strains. All phages were obtained from the environment and were not genetically manipulated in any way. **SalmoRid™** is sold as a concentrate; a 100X concentrate has a lytic titer of approximately 1×10^{11} PFU/mL.

Storage

SalmoRid™ has a shelf life of 12 months when stored refrigerated at 2-6°C in the original unopened container. Once opened, the contents should be used within 48 hr or aseptically stored.

All packaging is recyclable and is specifically designed to withstand moderately humid and cold environments recommended for storage.

Naturally
Targeted,
Salmonella
Eliminated