

# InvisiShield™

## Redefining food protection



Aptar
Active Material Science

aptarfoodprotection.com

# Evaluation of InvisiShield™ technology to reduce pathogens using the antimicrobial Chlorine Dioxide on processed onions

InvisiShield™

## OVERVIEW

To determine the influence of Aptar's InvisiShield™ technology against multiple strains of foodborne pathogens *Listeria monocytogenes*, *Salmonella enterica*, and Pathogenic *Escherichia coli* on commercially processed onions without negatively impacting organoleptics.

## RESEARCH

Processed onions were inoculated with three foodborne pathogen cocktails and treated in Aptar's InvisiShield™ technology trays in temperature-controlled storage (7°C) for up to 7 days at a 3rd party lab. Inoculated processed onions experienced significant reductions. The levels of chlorine dioxide used were safe for food and did not negatively impact the processed onions as demonstrated in the sensory panel results.

## BENEFITS

- Differentiated active packaging solution
- Protect high-risk products such as fresh-cut produce
- Self-determined GRAS
- Easy to implement on existing equipment

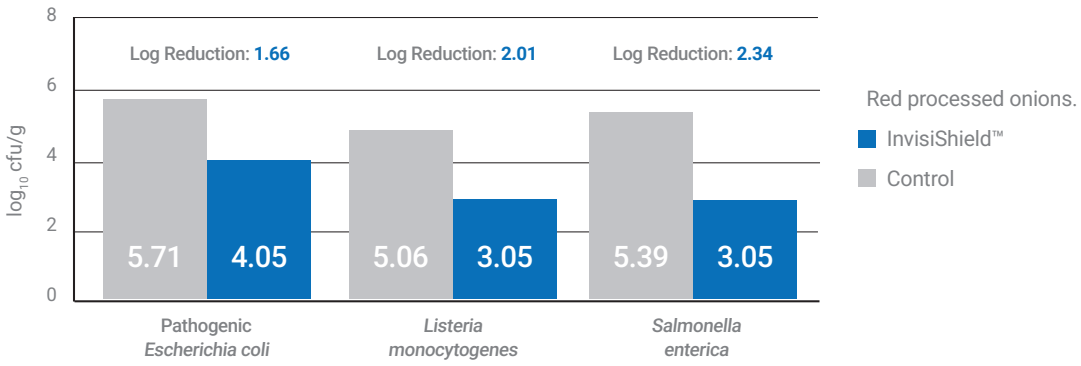
The InvisiShield™ material is extruded and remains stable throughout the supply chain distribution. It contains a base polymer, a channeling agent and the active ingredient ($ClO_2$). The release kinetics of $ClO_2$ is triggered by relative humidity in the package. $ClO_2$ then migrates through the same channels or through the polymer blend itself into the surrounding environment in a controlled manner.

Chlorine and chlorine dioxide has been used effectively for many years as an antimicrobial on food and water. We've unlocked the power of this highly effective agent in a sealed package so it can be utilized commercially. Chlorine dioxide gas is an antimicrobial of choice because it is very effective and is broad-spectrum, demonstrating efficacy against both gram-negative and gram-positive microorganisms. Aptar's novel InvisiShield™ technology is able to fill a gap and offer this effective antimicrobial to the industry due to the specially-engineered delivery system, which can safely create $ClO_2$ and control the dosage in the package in order to reduce negative organoleptic properties.



Processed Onions inoculated with three pathogens comparing control and InvisiShield™.

## RESULTS ~ APPROXIMATE 2 LOG REDUCTION IN PATHOGENS




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**foodprotection@aptar.com** | aptarfoodprotection.com

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