

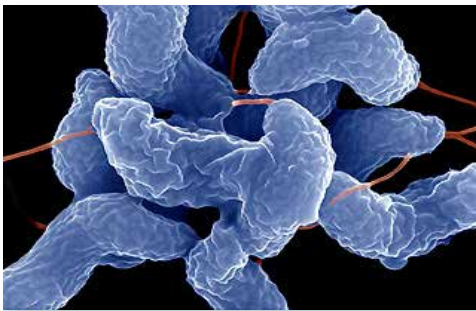
# Pathogen Testing

The vapor-steam produced by the Optima Steamer™ sanitizes and eliminates hazardous foodborne bacteria. With no chemicals and no wastewater run-off, dry vapor-steam is the most efficient cleaning solution for food and beverage facilities. The Optima Steamer™ was recently put to the test against the most common dangerous pathogens and the results truly display its sanitizing power.

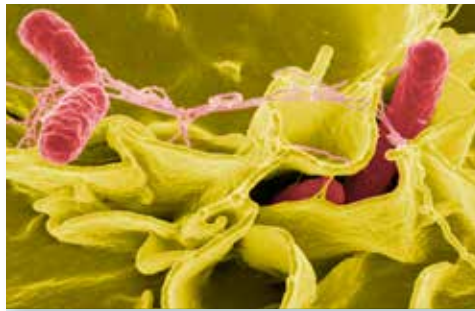


Pathogen	Source	Illnesses	Fatalities	Effectiveness
Staphylococcus aureus	Meats, potatoes, eggs, cream	241,148	378	Eliminated
Campylobacter coli	Poultry, milk	845,024	76	Eliminated
E.coli	Beef, milk, juice, crop produce	96,000	31	Eliminated
Listeria monocytogenes	Milk, cheese, RTE meats	1,600	260	Eliminated
Salmonella	Dairy, poultry, meat, crop produce	1,027,561	378	Eliminated
Norovirus	Uncooked foods, crop produce	5,461,731	149	Study in progress

\*statistics obtained from [www.cdc.gov](http://www.cdc.gov) and are based on the most recent yearly figure in the U.S.



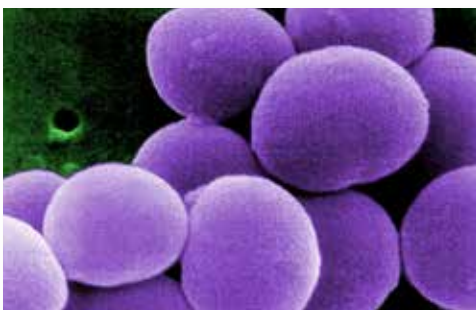
*Campylobacter coli*



*Salmonella*



*Listeria monocytogenes*



*Staphylococcus aureus*



*E.coli*



*Norovirus*

## The Procedure

A preliminary study was conducted by a third party laboratory, Lebrun Labs LLC – a GLP contract testing laboratory located in Anaheim, CA. The test was designed to determine if the most common foodborne pathogens in 5 different food-like substances (drinking water, chicken broth, beef broth, milk and blood) can be reduced in number or completely eliminated from common food preparation surfaces.

The microbes were obtained from the American Type Culture Collection (ATCC®) and cultured under standard conditions.

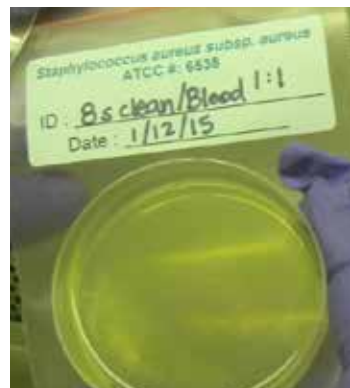
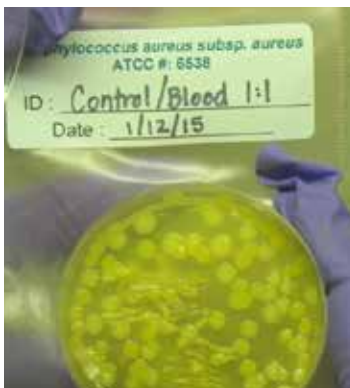
- Known concentrations of microbes added to food-like substances and applied to sterilized stainless steel
- Inoculated stainless steel transferred to biohazard chamber for testing
- Inoculated plates mounted for exposure and steam cleaned for defined exposure times

## The Results

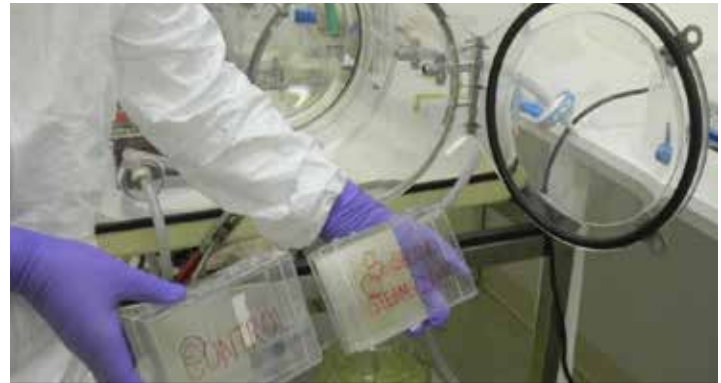
The procedures resulted in the complete elimination of *Staphylococcus aureus* on stainless steel after 8 seconds of cleaning, the complete elimination of *Campylobacter coli* on stainless steel after 8 seconds of cleaning.

The conclusion is that the Optima Steamer™ eliminates or significantly reduces the most common foodborne pathogens in a variety of food-like substances from food preparation surfaces.

Previously in 2012, Lebrun Labs tested the efficacy of elimination of 2 wine microbes (*Brettanomyces dekkera* and *Zygosaccharomyces bailii*) and *Escherichia coli* from glass, plastic (polystyrene), and stainless steel. It was found that the Optima Steamer™ eliminates the 2 wine spoilage microbes and *E. coli* from the surfaces of all material tested.



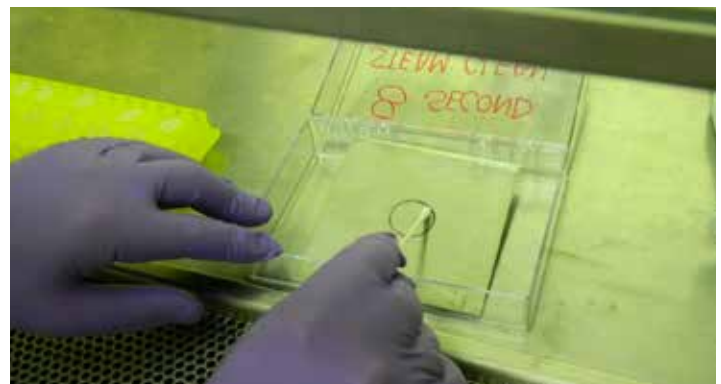
*Staphylococcus aureus* on stainless steel before and after elimination from 8 seconds of cleaning by the Optima Steamer™



Microbe concentrations mixed in food-like substances set on stainless steel and transferred to biohazard chamber for testing



Inoculated plates mounted for exposure and steam cleaned for defined exposure times



Microbes recovered from control (mock exposure) and steam cleaned stainless steel plates



The Optima Steamer™ sanitizes the most common, dangerous foodborne pathogens eliminating the risks of foodborne illness