tersano®

SAO® PATHOGEN SUMMARY

Independent Laboratory Testing Sponsored By Tersano, Inc.

Updated: April 2021

MICRO-ORGANISM	GROUP	STANDARD	REDUCTION	TIME
CLAIM: For use as a food-contact sanitizer on hard, non-porous surfaces. Testing conducted at Microchem Laboratory, Round Rock, TX 12/15/17				
Escherichia coli (E.coli) — ATCC 11 229	Bacteria	AOAC 960.09	> 99.999%	30 secs
Staphylococcus aureus (Staph) — ATCC 6 538	Bacteria	AOAC 960.09	> 99.999%	30 secs
CLAIM: For use as a non-food-contact sanitizer on hard, non-porous surfaces. Testing conducted at MycoScience Labs, Wilmington, CT 4/13/17				
Listeria monocytogenes — ATCC 19 115	Bacteria	AOAC 960.09	> 99.999%	30 secs
CLAIM: For use as a non-food-contact sanitizer on hard, non-porous surfaces. Testing conducted at Lapuck Labs, Canton, MA 3/17/16 and 2/26/16.				
Escherichia coli (E.coli) — ATCC 11 229	Bacteria	ASTM E1153	> 99.9%	30 secs
Salmonella typhimurium (Salmonella) — ATCC 1 428	Bacteria	ASTM E1153	> 99.9%	30 secs
CLAIM: For use as a non-food-contact sanitizer on hard, non-porous surfaces. Testing conducted at Lapuck Labs, Canton, MA 4/4/17.				
Enterococcus hirae — ATCC 10 541	Bacteria	BS EN 13697:2015	> 99.99%	5 mins
Escherichia coli (E. coli) — ATCC 10 536	Bacteria	BS EN 13697:2015	> 99.99%	5 mins
Pseudomonas aeruginosa — ATCC 15 442	Bacteria	BS EN 13697:2015	> 99.99%	5 mins
Staphylococcus aureus (Staph) — ATCC 6 538	Bacteria	BS EN 13697:2015	> 99.99%	5 mins
Candida albicans — ATCC 10 231	Yeast	BS EN 13697:2015	> 99.9%	30 mins
Aspergillus niger (A. niger) — ATCC 16 404	Mould	BS EN 13697:2015	> 99.9%	30 mins
CLAIM: For use as a food-contact sanitizer on hard, non-porous surfaces. Testing conducted at EMSL CANADA Inc., Mississauga, ON 12/22/20.				
Enterococcus hirae — ATCC 10 541	Bacteria	EN 1276:2019	> 99.999%	1 min
Escherichia coli (E. coli) — ATCC 10 536	Bacteria	EN 1276:2019	> 99.999%	1 min
Pseudomonas aeruginosa — ATCC 15 442	Bacteria	EN 1276:2019	> 99.999%	1 min
Staphylococcus aureus (Staph) — ATCC 6 538	Bacteria	EN 1276:2019	> 99.999%	1 min
CLAIM: For use as a sanitizer on hard, non-porous, clean (non-soiled) surfaces. Testing conducted at EMSL CANADA Inc., Mississauga, ON 12/09/20.				
Pseudomonas aeruginosa — ATCC 27 853	Bacteria	EN 1040	> 99.99999%	5 mins
Staphylococcus aureus (Staph) — ATCC 6 538	Bacteria	EN 1040	> 99.99999%	5 mins
CLAIM: Evaluation of virucidal activity against SARS-CoV-2. Testing conducted at Institute of Biology, State University of Campinas - UNICAMP, 4/14/20. Further unsponsored testing by: Fujita Health University / University of São Paulo (USP) / University of Queensland				
Coronavirus MHV-3 (Murine Hepatitis Virus)	Enveloped Virus	EN 14476	> 99.99%	1 min
Coronavirus SARS-CoV-2* (SARS-CoV-2/Hu/DP/Kng/19-020)	Enveloped Virus	Academic	99.9%	10 secs
Coronavirus SARS-CoV-2* (Brazil/SPBR-02/2020)	Enveloped Virus	Academic	> 99%	1 min
Coronavirus SARS-CoV-2 QLD02 (GISAID accession EPI_ISL_407896) & QLD935 (GISAID accession EPI_ISL_436097)	Enveloped Virus	Academic	>> 99%	5 mins
CLAIM: Evaluation of virucidal activity. Testing conducted at Institute of Biology, State University of Campinas - UNICAMP, 4/14/20.				
Influenza A Virus (HINI)	Enveloped Virus	EN 14476	> 99.99%	1 min
Measles Virus	Enveloped Virus	EN 14476	> 99.99%	1 min
Syncytial Respiratory Virus	Enveloped Virus	EN 14476	> 99.99%	1 min
CLAIM: Determination of the antiviral effectiveness of SAO using a suspension time-kill procedure against Canine Parvovirus. Testing conducted at Microchem Laboratory, Round Rock, TX.				
Canine Parvovirus — ATCC VR-2016	Small, non-enveloped virus	ASTM E1052	99.44%	5 mins

NOTE: All standard protocols are modified for the in situ generation of Stabilized Aqueous Ozone. BS EN 13697:2015, EN 1276 & EN 14476 standards were done under clean condition protocol. *Test of Aqueous Ozone.

Tested to meet or exceed TUV, UL and CSA standards. Tersano's SAO® is created by a dispenser regulated as a pesticidal device manufactured at EPA Establishment No. 089093-CAN-001.

Meets standards GS-37 and GS-53

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SIMPLE. SAFE. SUSTAINABLE.

AQUEOUS OZONE PATHOGEN SUMMARY

Independent Laboratory Testing Sponsored By Tersano, Inc.

Results from Tersano testing showing the power of aqueous ozone and the time required to destroy various bacteria at a strength of 2 ppm or less.

MICRO-ORGANISM	GROUP	STANDARD	REDUCTION	TIME
ODOR TEST RESULTS — Testing conducted at Microbiotest Inc.				
Proteus mirabilis — ATCC 7002	Bacteria	Fabric Surface Sanitizer Method	>99%	30 secs
BACTERIA TEST RESULTS — Testing conducted at Microbiotest Inc.				
Escherichia coli (E.coli) — ATCC 11 229	Bacteria	Fruit and Vegetable Antibacterial Wash Test	> 99.99%	30 secs
Listeria monocytogenesi (L. monocytogenes) — ATCC 19 111	Bacteria	Fruit and Vegetable Antibacterial Wash Test	> 99.99%	30 secs
Escherichia coli (S. choleraesuis) — ATCC 10 708	Bacteria	Fruit and Vegetable Antibacterial Wash Test	> 99.99%	30 secs

3rd Party Testing Of Ozone Efficacy Against Pathogens

Results for Aqueous Ozone Tested for Use as an Anti-Microbial Treatment

Data compiled from third party independent industry and academic sources, and is for general information purpose only. Kill rates vary with temperature, surface texture, pH and other factors.

MICROBE	REDUCTION	OZONE	CONTACT TIME	SOURCE
Hepatitis A	99.999%	1.00 ppm	30 secs	Canadian Journal of Microbiology
Human Rotavirus Type 2 (Wa)	99.99%	0.25 ppm	10 secs	Applied and Environmental Microbiology
Enteric Adenovirus (AD40)	99.9%	0.30 ppm	30 secs	Water Research
Feline calicivirus	99.99%	1.00 ppm	15 secs	Water Research
Norwalk Virus	99.9%	0.37 ppm	10 secs	Applied and Environmental Microbiology
Poliovirus 1	99.9%	0.37 ppm	60 secs	Applied and Environmental Microbiology
Bacteriophage F2	99.99999%	0.8 ppm	5 secs	Applied and Environmental Microbiology
Mycobacterium avium	99.9%	1.2 ppm	5 secs	Virginia Tech - MSc Thesis*
Trichophyton mentagrophytes	99.9999%	1.5 ppm	30 secs	NSF Toxicology Group**
Salmonella choleraesuis	99.9999%	1.5 ppm	3 mins	NSF Toxicology Group**
Clostridium difficile	99.99999%	0.6 ppm	3 mins	Ozone: Science and Engineering***
E. faecalis (Streptococcus faecalis)	99.99999%	0.6 ppm	3 mins	Ozone: Science and Engineering***

*Based on Concentration/contact Time (CT) of 0.1 ppm·min
**Residual (measurable) dose of around 1.5 ppm ozone in water solution.
***Test within a Laundry System in ambient cold water

Aqueous Ozone is approved by the EPA, FDA, USDA, is considered GRAS, and is compliant with the EPA Organic Program as a natural and effective cleaner and sanitizer.

NSF Nonfood Compounds Program Listed P1 Registration #152236	Awarded Maximum 10 Points	GRAS and compliant with the EPA Organic Program	Aqueous ozone approved as antimicrobial agent June 26, 2001	USDA/National Organic Program (NOP) Ozone Approval

For more detailed kill rate data along with a more thorough and complete list of microbes, please contact your Tersano Customer Representative.