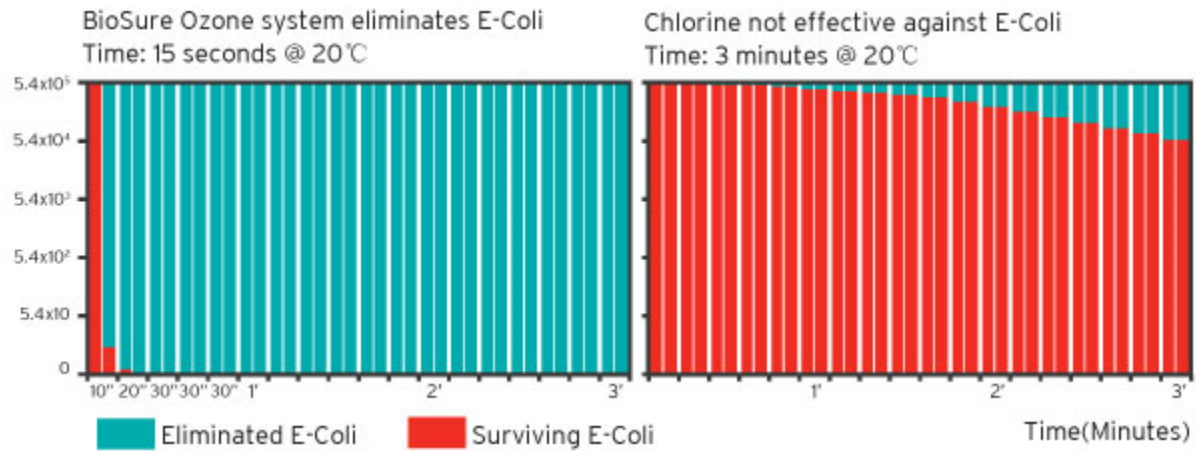
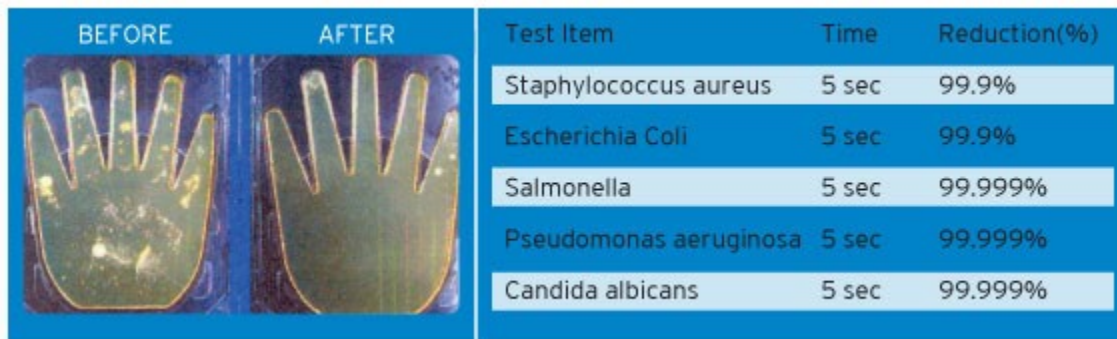


BioWell OZONE vs. CHLORINE: Disinfection Effectiveness



BioWell OZONATED WATER HAND WASH REPORT from Dokkyo Medical University, Japan



SGS TEST BioWell OZONATED WATER DISINFECTION REPORT

Test Item	0sec	5sec	15sec	Reduction(%)
Staphylococcus aureus (CFU/ml)	5.4×10 ⁵	Not Detected	Not Detected	>99.999

Antimicrobial Effectiveness Testing	Escherichia Coli (CFU/ml)	2.5×10 ⁵	6.1×10	< 10	99.99
	Salmonella (CFU/ml)	1.7×10 ⁵	1.9×10	Not Detected	99.9
	Pseudomonas aeruginosa (CFU/ml)	4.5×10 ⁵	Not Detected	Not Detected	>99.999
	Candida albicans (CFU/ml)	1.3×10 ⁵	Not Detected	Not Detected	>99.999
	MRSA (CFU/ml)	1.3×10 ⁵	Not Detected	Not Detected	>99.999
Decomposition of Residual Pesticide	Mevinphos	0.642	0.000		100
	Permethrin	0.559	0.0337		94
Total Residual Chlorine	Tap Water (mg/L)	O ₃ Water (mg/L)			
	0.10	0.02			80
<p>SGS is the world's leading inspection, verification, testing and certification company. SGS is recognized as the global benchmark for quality and integrity. With more than 48,000 employees, SGS operates a network of over 1,000 offices and laboratories around the world.</p>					

CT VALUES

According to research, the effectiveness of a chemical to inactivate a microorganism (bacteria or virus) based on chemical concentration and contact time can be represented as its "CT" value: where C is the concentration of the chemical dissolved in

US EPA
CT Values (ppm*min) for Virus Inactivation by
Ozone

Temperature

water (ppm) and T is its continuous contact time with the microorganism. It expresses the effect of the chemical concentration and time interaction needed to inactivate the microorganism.

Inactivation	<1	5	10	15	20	25
2-log	0.9	0.6	0.5	0.3	0.25	0.15
3-log	1.4	0.9	0.8	0.5	0.4	0.25
4-log	1.8	1.2	1.0	0.6	0.5	0.3

<p>CT Values (ppm*min) For 99.9% Inactivation of Giardia and 99.99% Virus</p>					<p>Ct values (mg.min/L) for inactivation of Cryptosporidium by ozone*</p>		
<p>Data for 5?</p>					<p>Temp(?)</p>		
	Free Chlorine	Chloramine	Chlorine Dioxide	Ozone pH	99%	99.9%	
	pH 6~7	pH 8~9	pH 6~7	6~7	0.5	57.9	83
Giardia	122	2,200	26.0	1.9	5	32.5	46.6
Virus	8	1,988	33.4	1.2	10	17.5	25.1
<p>Taken from: "Optimizing Water Treatment Plant Performance Using Composite Correction Program" Prepared by Process Applications, Inc., for the U.S. EPA, Office of Drinking Water, Cincinnati, Ohio.</p>					15	9.6	13.8
					20	5.39	7.73
					25	3.08	4.42
					30	1.79	2.96
					<p>From Table 13.1 of the Drinking-Water Standards for New Zealand 2000.</p>		

BioWell OZONE vs COMMON DISINFECTION

BioWell's ozone generation system enables ozone to be used more

BioWell Alcohol Liquid Chlorine Heat & Ozone Gel Chlorine Dioxide Steam

effectively in a range of applications because of the following features:

- Tap water is the only required input
- Generates High concentration ozonated water
- High ozone dissolution and efficient destruct technology.

With BioWell's point-of-use products ozone can now be used in a much larger range of applications with greater cost effectiveness.

Comparisons of Ozone with other Disinfectants:

Application, Operation, Effectiveness and Convenience

Hand Sanitation	✓	✓	✓	✓	✗
Produce Wash	✓	✗	✓	✓	✗
Utensil Disinfection	✓	✗	✓	✓	✓
Water Disinfection	✓	✗	✗	✗	✗
Surface Disinfection	✓	✗	✓	✓	✗
Deodorizing	✓	✗	✗	✗	✗
Thawing	✓	✗	✗	✗	✗
Pre-Storage Rinse	✓	✗	✗	✗	✗

	BioWell Ozone	Alcohol Gel	Liquid Chlorine	Chlorine Dioxide	Heat & Steam
Efficacy	highest	medium low	medium	medium high	medium low
No chemical residues	✓	✗	✗	✗	✓
Initial cost	medium	low	low	low	high
Running cost	low	medium	medium	medium	medium
Reliable Efficacy	✓	✗	✗	✗	✗

Safe Operation	✓	✗	✗	✗	✗
Simple Use	✓	✓	✗	✗	✗
Sustainable Operation	✓	✗	✗	✗	✗
Fast effectiveness <10mins	✓	✗	✗	✗	✗
Energy/water expenditure	low	low	high water	high water	high

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	BioWell Ozone	Alcohol Gel	Liquid Chlorine	Chlorine Dioxide	Heat & Steam
Effective on bacteria	✓	✓*	✓*	✓*	✓*
Effective on viruses	✓	✗	✗	✗	✗
Effective on pesticides	✓	✗	✗	✗	✗
Residual disinfection	✓**	✓*	✓*	✓*	✗
Free from chemical storage	✓	✗	✗	✗	✓
Effective deodorizer	✓	✗	✗	✗	✗
Compatible with all materials (including raw food materials)	✓	✗	✗	✗	✗
Extend shelf time	✓	✗	✗	✗	✗
Environmentally	✓	✗	✗	✗	✗
Friendly	✓	✗	✗	✗	✗

* Effective in lab controlled test but proven to be inconstant in practical application.

** Ozone has a residence time of 20 minutes, Biowell Ozonated water will provide disinfection more than 10 minutes after output