Quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas (Phase 2 Step 1)

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PO/Quote number: Q003619
Report Date: 09/10/2020
Issue Number:1

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Scope

The standard method BS EN 1276:2019 describes a suspension test method for establishing whether a chemical disinfectant or antiseptic has or does not have bactericidal activity in the fields described.
The test takes into account practical conditions of application of the product, including contact time, temperature, test organisms and interfering substance, i.e. conditions which may influence its action in practical situations.
The conditions are intended to cover general purposes and to allow reference between laboratories and product types. Each utilization concentration of the chemical disinfectant or antiseptic found by this test corresponds to defined experimental conditions. However, for some applications, the recommendations of use of a product may differ and therefore additional test conditions may need to be used.

Outline of Test Method (Obligatory Test Conditions)

A sample of the test product is diluted in synthetic hard water for products diluted at point of use (or distilled water in the case of ready to use products). A test suspension of bacteria and interfering substance is then added to the dilutions and maintained at 20°C for 1-60 minutes (general purpose disinfection) or 30-60 seconds (hand hygiene products) At the end of the contact time an aliquot is taken, and the bacterial / bacteriostatic activity is immediately neutralised or suppressed by the validated method. The numbers of surviving bacteria in each sample are determined and the reduction is calculated.
The test is performed using *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus* and *Enterococcus hirae* as standard organisms.
Products can only be tested at a concentration of 80 % or less, as some dilution is always produced by adding the test organisms and interfering substance.

Acceptance Criteria

The product when tested as above shall demonstrate at least a 5 $\log_{10}$ (3 $\log_{10}$ hand washes) reduction in viable bacterial counts. The test is deemed valid where all control requirements are met.

UKAS Accreditation

This method has been audited by UKAS to the ISO 17025 standard, for tests where no deviations from the standard method are stipulated.

Test information		Deviation
Name of Product	Alcohol-Free Hand Sanitising Gel	
Batch Number & Expiry Date	DDACGEL	
Date of Delivery	26/08/2020	
Period of Analysis	08/10/2020-10/10/2020	
Manufacturer / Supplier	Orcagel Company Ltd	
Storage Conditions	Ambient	
Appearance of the Product	Clear liquid	
Neutraliser	N6	
Neutralisation Method	Dilution	
Product Diluent	Distilled water	
Test Concentrations	Neat (80%), Mid-range (50%), Non active (0.1%)	
Experimental Conditions	Clean	
Interfering Substance	Clean 0.3g/l Bovine Albumin	
Test Temperature	20°C ± 1°C	
Temperature of Incubation	Bacteria – 37°C ±1°C for 24hr to 48hrs	
Identification of the Bacterial Strains:	*Pseudomonas aeruginosa* NCTC 13359 (ATCC 15442) *Staphylococcus aureus* NCTC 10788 (ATCC 6538) *Enterococcus hirae* NCTC 13383 (ATCC 10541) *Escherichia coli* NCTC 10418 (ATCC 10536)	
Contact Times	2 minutes ± 10s	
Stability and Appearance During Test	No Change Observed	

Deviations from Standard Method

There were no deviations from the standard method

Test Result Summary

The test product received has achieved a >5 log reduction against all bacterial test isolates when tested under the condition stipulated in this report.

See page 2 for acceptance criteria and raw data tables below for complete test results.

Validation and Controls

Validation suspension (Nv_0)				Experimental condition controls (A)				Neutraliser or Filtration Control (B)				Method Validation (C)			
			$\bar{x}$ =				$\bar{x}$ =				$\bar{x}$ =				$\bar{x}$ =
Vc1	Ps.	44		Vc1	Ps.	89		Vc1	Ps.	58		Vc1	Ps.	93	
	Sa.	97			Sa.	99			Sa.	89			Sa.	86	
	Ec.	61	Ps. 68		Ec.	60	Ps. 83		Ec.	71	Ps. 54		Ec.	57	Ps. 108
	Ent.	49	St. 100		Ent.	49	St. 91		Ent.	63	St. 96		Ent.	67	St. 85
Vc2	Ps.	92	Ec. 67	Vc2	Ps.	76	Ec. 51	Vc2	Ps.	50	Ec. 70	Vc2	Ps.	122	Ec. 51
	Sa.	102	Ent. 54		Sa.	83	Ent. 47		Sa.	102	Ent. 57		Sa.	84	Ent. 49
	Ec.	72			Ec.	42			Ec.	69			Ec.	44	
	Ent.	58			Ent.	45			Ent.	50			Ent.	31	
$30 \leq \bar{x}$ of $Nv_0 \leq 160$?				$\bar{x}$ of A ≥ 0.5 Nv0				$\bar{x}$ of B ≥ 0.5 Nv0				$\bar{x}$ of C ≥ 0.5 Nv0			
Yes				Yes				Yes				Yes			

Test Results

		Test Procedure at concentrations % (V/V)		
Test Organism	**Suspension N**	**Neat**	**50**	**0.1**
Pseudomonas	10^6 >330 ; >330	10^0 0 ; 0	10^0 5 ; 0	10^4 200 ; 200
aeruginosa	10^7 34 ; 49	Na ; < 2.15	Na ; < 2.15	Na ; 7.30
ATCC 15442	N_0 : 7.62 Valid	R > 5.47	R > 5.47	R 0.32
Escherichia	10^6 185 ; 203	10^0 0 ; 0	10^0 0 ; 0	10^4 162 ; 115
coli	10^7 15 ; 19	Na ; < 2.15	Na ; < 2.15	Na ; 7.14
ATCC 10536	N_0 : 7.28 Valid	R > 5.14	R > 5.14	R 0.14
Staphylococcus	10^6 194 ; 204	10^0 0 ; 0	10^0 0 ; 0	10^4 250 ; 249
aureus	10^7 19 ; 17	Na ; < 2.15	Na ; < 2.15	Na ; 7.40
ATCC 6538	N_0 : 7.30 Valid	R > 5.15	R > 5.15	R -0.10
Enterococcus	10^6 189 ; 191	10^0 0 ; 0	10^0 0 ; 0	10^4 106 ; 104
hirae	10^7 17 ; 20	Na ; < 2.15	Na ; < 2.15	Na ; 7.02
ATCC 10541	N_0 : 7.28 Valid	R > 5.13	R > 5.13	R 0.26

KEY

N_0	Log_{10} number of cfu/ml at the beginning of the contact time = $N/10$
Nv_0	is the number of cfu/ml in the validation test suspension at the beginning of the contact time
A	is the verification of experimental conditions control
B	is the neutraliser toxicity control
C	is method validation
Vc	is the colony forming units counted per 1ml of sample
$\bar{x}$	is the average of Vc_1 & Vc_2
$\bar{x}$ wm	is the weighted mean of *N*
Na	Log_{10} number of surviving cfu/ml in the test mixture
R	($lg N_0 – lg Na = lg R$) is the calculation for reduction in viability
>	Greater than
≥	Equal to or greater than
<	Less than
≤	Equal to or less than

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