

## Preliminary Evaluation of Probe Industries AiroPure System for Antimicrobial Activity

	Organism	Reference	MIC
1	Escherichia coli	NCTC 10418	1/512
2	Klebsiella pneumoniae	NCTC 9528	1/512
3	Providencia rettgeri	NCTC 7475	1/1024
4	Enterobacter cloacae	NCTC 11936	1/512
5	Serratia marcescens	NCTC 10211	1/512
6	Salmonella typhimurium	NCTC 74	1/512
7	Pseudomonas aeruginosa	NCTC 10662	1/512
8	Staphylococci epidermidis	NCTC 11047	1/2048
9	Streptococcus pyogenes	NCTC 8306	≤ 1/4096
10	Enterococcus faecalis	NCTC 775	1/2048
11	Enterococcus faecium	NCTC 7171	1/512
12	Listeria monocytogenes	NCTC 11994	1/1024
13	Staphylococcus aureus	NCTC 6571	1/2048
14	Yersinia enterocolitica	NCTC 11176	1/512
15	Candida albicans	ATCC 90028	1/256
16	Staphylococcus aureus (MRSA)	NCTC 11939	1/2048
17	Burkholderia cepacia	LMG 1222	1/512
18	Bacillus subtilis	NCTC 9372	1/2048
19	Candida glabrata	NCPF 9725	1/256
20	Acinetobacter baumannii	ATCC 19606	1/1024
21	Legionella bozemanii	NCTC 11368	1/1024
22	Legionella pneumophila	NCTC 11406	1/512
23	Legionella micdadei	NCTC 11371	1/512
24	Legionella pneumophila	NCTC 12821	1/1024
25	Bacteroides fragilis	NCTC 8560	1/128
26	Peptostreptococcus anaerobius	NCTC 11460	1/1024
27	Clostridium perfringens	NCTC 10240	1/512
28	Clostridium difficile	NCTC 11204	1/512

Report date: 09/12/2008

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Dilution in agar	Reference	1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512	1/1024	1/2048	1/4096	Control	MIC
1 <i>Escherichia coli</i>	NCTC 10418	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
2 <i>Klebsiella pneumoniae</i>	NCTC 9528	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
3 <i>Providencia rettgeri</i>	NCTC 7475	-	-	-	-	-	-	-	-	-	-	+	+	+	1/1024
4 <i>Enterobacter cloacae</i>	NCTC 11936	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
5 <i>Serratia marcescens</i>	NCTC 10211	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
6 <i>Salmonella typhimurium</i>	NCTC 74	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
7 <i>Pseudomonas aeruginosa</i>	NCTC 10662	-	-	-	-	-	-	-	-	-	+	+	+	+	1/512
8 <i>Staphylococci epidermidis</i>	NCTC 11047	-	-	-	-	-	-	-	-	-	-	-	+/-	+	1/2048
9 <i>Streptococcus pyogenes</i>	NCTC 8306	-	-	-	-	-	-	-	-	-	-	-	-	+	≤ 1/4096
10 <i>Enterococcus faecalis</i>	NCTC 775	-	-	-	-	-	-	-	-	-	-	-	+/-	+	1/2048
11 <i>Enterococcus faecium</i>	NCTC 7171	-	-	-	-	-	-	-	-	-	+/-	+/-	+	+	1/512
12 <i>Listeria monocytogenes</i>	NCTC 11994	-	-	-	-	-	-	-	-	-	-	+/-	+	+	1/1024
13 <i>Staphylococcus aureus</i>	NCTC 6571	-	-	-	-	-	-	-	-	-	-	-	+	+	1/2048
14 <i>Yersinia enterocolitica</i>	NCTC 11176	-	-	-	-	-	-	-	-	-	+/-	+/-	+	+	1/512
15 <i>Staphylococcus aureus (MRSA)</i>	NCTC 11939	-	-	-	-	-	-	-	-	-	-	-	+/-	+	1/2048
16 <i>Burkholderia cepacia</i>	LMG 1222	-	-	-	-	-	-	-	-	-	+/-	+	+	+	1/512
17 <i>Bacillus subtilis</i>	NCTC 9372	-	-	-	-	-	-	-	-	-	-	-	+	+	1/2048
18 <i>Acinetobacter baumannii</i>	ATCC 19606	-	-	-	-	-	-	-	-	-	-	+	+	+	1/1024
19 <i>Candida glabrata</i>	NCPF 9725	-	-	-	-	-	-	-	-	+/-	+/-	+/-	+/-	+	1/256
20 <i>Candida albicans</i>	ATCC 90028	-	-	-	-	-	-	-	-	+/-	+/-	+	+	+	1/256

**Annotation:      -   No growth    +/-   Weak growth      +   Unrestricted growth**

### MIC Studies with *Legionella* spp

21 <i>Legionella bozemanii</i>	NCTC 11368	-	-	-	-	-	-	-	-	-	-	+	+	+	1/1024
22 <i>Legionella pneumophila</i>	NCTC 11406	-	-	-	-	-	-	-	-	-	+/-	+	+	+	1/512
23 <i>Legionella micdadei</i>	NCTC 11371	-	-	-	-	-	-	-	-	-	+/-	+	+	+	1/512
24 <i>Legionella pneumophila</i>	NCTC 12821	-	-	-	-	-	-	-	-	-	-	+	+	+	1/1024

### MIC Studies with Anaerobic bacteria.

25 <i>Bacteroides fragilis</i>	NCTC 8560	-	-	-	-	-	-	-	+/-	+/-	+	+	+	+	1/128
26 <i>Peptostreptococcus anaerobius</i>	NCTC 11460	-	-	-	-	-	-	-	-	-	-	+	+	+	1/1024
27 <i>Clostridium perfringens</i>	NCTC 10240	-	-	-	-	-	-	-	-	-	+/-	+	+	+	1/512
28 <i>Clostridium difficile</i>	NCTC 11204	-	-	-	-	-	-	-	-	-	+/-	+	+	+	1/512

### Method summary

Composition of agar plates	Product (ml)	Water (ml)	Dilution	(Oxoid CMO 471)	
	10	-	1/2	10*	
	5	5	1/4	10*	*double strength agar used where indicated.
	2.5	7.5	1/8	10*	
	1.25	-	1/16	18.7	Inoculum: 10000 cfu
	0.625	-	1/32	19.4	(1 µl of 1/15 dilution of 0.5 McFarland suspension).
	0.312	-	1/64	19.7	Incubation at 37°C for 20 h in air.
	0.156	-	1/128	19.8	
	0.078	-	1/256	19.9	
	0.039	-	1/512	20	
	0.0195	-	1/1024	20	
	0.0097	-	1/2048	20	
	0.0048	-	1/4096	20	

### Comments

MIC = Minimum Concentration of Product required to inhibit microbial growth.

As the concentration of active ingredients is unknown, this is expressed as a dilution factor of 'neat' product.

**1 to 18:** The growth of all 18 test bacteria was inhibited at a dilution of 1/512 in Isosensitest agar.

**19 & 20:** Two species of yeasts were inhibited by a dilution of 1/256. Gram positive bacteria were generally more susceptible than Gram negative bacteria.

**21 to 24:** Show the completed studies with Legionella species. Legionella was inhibited at a dilution of 1/512. Airopure is highly active against Legionella

**25 to 28:** The first three species are representative of the commonest anaerobic species found in the gut and in faeces. C. difficile is perhaps the commonest anaerobic species implicated in human disease.

Tests performed in FAA medium plus 5% horse serum (blood excluded due to catalase activity).

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