

## PDF hosted at the Radboud Repository of the Radboud University Nijmegen

The following full text is a publisher's version.

For additional information about this publication click this link.

<http://hdl.handle.net/2066/14785>

Please be advised that this information was generated on 2018-07-07 and may be subject to change.

## Letters to the Editor

Sir,

### **Efficacy of the antiseptic solution 'TCP' against *Staphylococcus aureus* and *Pseudomonas aeruginosa***

The liquid antiseptic 'TCP' (Pfizer Limited, Nigeria), which consists mainly of phenol  $6.3 \text{ g l}^{-1}$ , chlorine  $4.0 \text{ g l}^{-1}$  and iodine  $0.6 \text{ g l}^{-1}$ , is recommended by the manufacturers for first aid uses for bruises, cuts, boils, minor burns and as a gargle. The recommended use—dilutions of the antiseptic are 1 in 4 and 1 in 6 with water, giving about  $1.5 \text{ g l}^{-1}$  and  $1.0 \text{ g l}^{-1}$  phenol content. We report the antibacterial activity of 'TCP' against *Staphylococcus aureus* and *Pseudomonas aeruginosa* under different conditions.

The MICs of 'TCP' and phenol were determined by arithmetic dilution in broth (Crowshaw, 1983). Graded volumes of 'TCP' or phenol solution, sterile distilled water (SDW) or sterile tap water (STW) and a fixed volume of a standardized broth culture were added to each of 5 ml double strength nutrient broth so that the final volume of each broth was 10 ml and the bacterial cell concentration approximately  $10^7 \text{ cfu ml}^{-1}$ . A parallel test was carried out in which horse serum (HS) was added to achieve a final strength of 10% v/v. The broths were incubated at  $37^\circ \text{C}$  for 24 h and the MIC was defined as the lowest concentration showing no growth by visual inspection. From all the broths two loopfuls were removed and subcultured on nutrient agar plates which were then incubated at  $37^\circ \text{C}$  for 24 h. The MBC was defined as the lowest concentration that showed no growth on subculturing (Waterworth, 1978). Using SDW as diluent, results in Table I show that MIC values were essentially the same to both organisms, and were doubled in the presence of horse serum. The results also show that the MBCs of the antiseptic were higher than the MICs for each organism. Comparing the MIC and MBC of 'TCP' with that of pure phenol indicates that the activity of phenol in the 'TCP' has been increased from four to eight fold.

The effect of 'TCP' and pure phenol on the viability of the test organisms was studied by determining the survivors of an initial cell concentration of  $2.0 \times 10^6 \text{ cfu ml}^{-1}$  after 10 min contact time at room temperature ( $28\text{--}30^\circ \text{C}$ ) using the pour plate method. The results were expressed as the percentage viability of the original cell population. When 'TCP' was diluted in SDW, to give the use—dilution of  $1.0 \text{ g l}^{-1}$  phenol there was rapid loss of viability with reduction of the viability to 6.5% of the original population of *S. aureus*. Table I also shows that  $10 \text{ g l}^{-1}$  of pure phenol caused a reduction to 60.1% viability of the same organism after 10 min.

Table I. Activity of 'TCP' and phenol against *Staphylococcus aureus* and *Pseudomonas aeruginosa*

		MIC and MBC values (mg l <sup>-1</sup> ) and the % viability after 10 min					
		'TCP'			Phenol		
		MIC	MBC	% Viability	MIC	MBC	% Viability
<i>S. aureus</i>	SDW	320	950	6.5	2500	4000	60.1
	STW	630	1260	26.0	2500	4000	59.8
	10% HS	630	1600	ND	3500	6000	ND
<i>P. aeruginosa</i>	SDW	320	950	10.0	2500	4000	55.2
	STW	630	1260	20.5	2500	4000	54.8
	10% HS	630	1600	ND	3500	6000	ND

'TCP' values expressed as phenol content; SDW, sterile distilled water; STW, sterile tap water; ND, not determined; HS, horse serum.

Using STW to dilute the 'TCP' resulted in an increase of MIC and MBC to levels similar to those found when the broths contained serum. There was also less kill of the test organisms when 'TCP' was diluted in STW. Such adverse effects were not demonstrated with pure phenol solutions. Our results have confirmed the improved activity of phenol in 'TCP' by the addition of the halogens and that even in the lower recommended strength the antiseptic was effective against *P. aeruginosa*, an organism that frequently shows increased resistance to many antiseptics and disinfectants (Stickler & Thomas, 1982). It must however be pointed out that the loss of activity of the antiseptic in potable water can occur in varying degrees depending on the type of water available for dilution, especially for domiciliary use. This adverse effect by tap water together with the loss of activity in the presence of proteins as for other antiseptics will cause severe loss of antibacterial activity of this useful antiseptic.

**Y. B. Acheampong**  
**A. El-Mahmood**  
**P. F. Olurinola**

*Department of Pharmaceutics & Pharmaceutical  
 Microbiology, Ahmadu Bello University,  
 Zaria, Nigeria*

### References

- Crowshaw, B. (1983). Evaluation of non-antibiotic antimicrobial agents. In *Pharmaceutical Microbiology*, 3rd edn (Hugo, W. B. & Russell, A. D., Eds) pp. 237-257. Blackwell, Oxford.
- Stickler, D. J. & Thomas, B. (1982). Intrinsic resistance to non-antibiotic antibacterial agents. In *Principles and Practice of Disinfection, Preservation and Sterilisation* (Russell, A. D., Hugo, W. B. & Ayliffe, G. A. J., Eds) pp. 186-189. Blackwell, Oxford.
- Waterworth, P. W. (1978). Quantitative methods for bacterial sensitivity testing. In *Laboratory Methods in Antimicrobiological Chemotherapy*, 1st edn (Reeves, D. S., Phillips, I., Williams, J. D. & Wise, R., Eds) pp. 37-38. Churchill Livingstone, Edinburgh.

Sir,

### Spore tests for low temperature steam with formaldehyde sterilizers

A standard test helix is used to monitor the performance of low temperature steam with formaldehyde (LTSF) sterilizers (Line & Pickerill, 1973; DHSS, 1980). Adequate penetration of the sterilizing vapour into the test piece will kill spores on a disc placed in the capsule at the end of the helix. After commissioning, a spore disc placed in the helix is used routinely to monitor each load (DHSS, 1980; Tyrer, *et al.*, 1986), but we have discovered recently that, in some circumstances, spores in the test helix can be killed when there is a failure of sterilization throughout the whole chamber.

We have recently carried out spore tests on a recommissioned LTSF sterilizer (Sterilizer and Equipment Company). For these tests, 27 spore discs (Southern Group Laboratories) were suspended on cotton threads in the empty chamber, and two test helices were also included. In the initial test all spores germinated except those from the disc in the helix capsules. After modifications to the cycle programme the number of spores germinating was reduced to four out of 27, but in five separate cycles with failure of sterilization in the chamber there was no growth of spores from the two helices. Formaldehyde test papers in the chamber showed incomplete colour changes, and it was found that the chamber drain valve remained open during part of the "holding" stage of the cycle. We believe that formaldehyde vapour drawn into the helix during evacuation and pulsing remained there while slowly escaping from the chamber. Conditions for sterilization in LTSF processes are critical and must be carefully controlled. (Tyrer *et al.*, 1986; Alder, 1987).

After adjustment of the faulty programme, further tests on spores suspended in the chamber and placed in helices, rubber tubes and syringes have all be satisfactory. We are concerned that if faults are not recognized in a programme for a LTSF sterilizer, resulting in sub-optimal conditions in the chamber, failure of sterilization of the load will not be detected by the routine use of the helix for the spore test and we believe that extra spore discs should be used as well as the helix in each load, as originally described by Line and Pickerill (1973).

**D. S. Tompkins**

**M. Dunn**

**M. E. Cade**

*Bradford Royal Infirmary,  
Bradford BD9 6Rf*

### References

- Alder, V. G. (1987). The formaldehyde/low temperature steam sterilizing procedure. *Journal of Hospital Infection* **9**, 194-200.
- DHSS (1980). Departmental advice on some aspects of disinfection and sterilization. *Health Equipment Information No. 88 95/80* 26-30.
- Line, S. J. & Pickerill, J. K. (1983). Testing a steam formaldehyde sterilizer for gas penetration efficiency. *Journal of Clinical Pathology* **26**, 716-720.
- Tyrer, B., Babb, J., Line, S. & Oliver, P. (1986). Report of a working party on sterilization and disinfection of heat labile equipment. *Central Sterilizing Club*, Birmingham.

Sir,

### **A marker of personal hygiene?**

In certain human environments it may be useful to have some measure of personal hygiene. We consider that the recovery of *Escherichia coli* from the anterior nares of human subjects may reflect the frequency of handwashing, as well as hygiene at toilet and the degree of hand contact with the nose.

We obtained nasal swabs from 335 students at the Institute of Medical Technology in Bagdad. Swabs were plated on MacConkey agar and *E. coli* identified by colonial morphology. Thirty-eight students were found to be positive.

Handwashing facilities at the Institute are restricted and soap is not always available. We feel that the carriage rate of 10.7% of *E. coli* in the anterior nares of these students may reflect a low standard of hygiene. It is frequently the case in our society that domestic hygiene facilities are poor and towels are often shared within families. It would be of interest to know whether recovery of *E. coli* from the anterior nares may act as a marker in personal hygiene, and we suggest that further data of this sort should be obtained.

**A. A. Abood**  
**Z. Alani**  
**M. Derwish**

*Institute of Medical Technology,  
Bab Al-Mouadam,  
Bagdad,  
Iraq*

Sir,

### **Pseudobacteriuria with *Serratia marcescens***

A 19-year old woman was referred because of chronic fatigue. In order to exclude a urinary-tract infection, a suprapubic bladder puncture was performed. The urine culture yielded no growth on primary plates but *Serratia marcescens* was recovered in enrichment medium. This result was considered to indicate contamination and investigations for possible sources were carried out.

Bladder aspiration was carried out under ultrasound guidance. Ultrasound jelly was interposed between the skin surface and the ultrasound scanhead. The distended bladder was visualized sonographically and a suitable site for bladder puncture marked between gloved finger and thumb on the abdominal wall. The jelly was removed with cotton swabs and the suprapubic area disinfected with 0.5% alcoholic chlorhexidine solution. Under aseptic conditions 10 ml of urine is aspirated transcutaneously. Sensitivity testing was performed on Isosensitest agar (Oxoid) with Multodisks (Oxoid). The jelly as in use, the 0.5% alcoholic chlorhexidine

solution and the cotton swabs were cultured in thioglycolate broth (Oxoid) and on tryptic soy agar (Oxoid) with 5% human blood. *Serratia marcescens* was identified using urea, indole, triple sugar iron agar, lysine decarboxylase, ornithine decarboxylase, motility, VP, Simmon's citrate. For further identification to species level, DNase and arabinose were added.

*Serratia marcescens* of the same antibiotic susceptibility pattern as the strain from the patient's bladder urine was recovered from the ultrasound jelly. Both strains were resistant to: cephalothin, colimycin, nalidixic acid, and nitrofurantoin; they were susceptible to: gentamicin, tetracycline, sulphonamides, cotrimoxazole and ticarcillin.

This susceptibility pattern is markedly different from our *S. marcescens* hospital strains, which have been resistant to gentamicin, co-trimoxazole and ticarcillin. Epidemiological inquiry revealed that the jelly, made at the hospital pharmacy, is too viscous for convenient use and that it was diluted in the outpatient department with tap water. *Serratia marcescens* was not isolated from the jelly in the hospital pharmacy, nor from undiluted jelly in the outpatient department. The jelly consists of carbopol 940 10 g, methyl hydrobenzoate 1 g, sodium edetate 0.5 g, purified water 1 l, sodium hydroxide 2N solution 50 ml, and can easily be made less viscous by adding less carbopol and sodium hydroxide, thus avoiding dilution with tap water. Contaminated recipients were removed and no further incidents occur.

Many reports on infections and pseudoinfections by contamination of equipment and liquids with *S. marcescens* have appeared in the literature; e.g. breast pumps (Gransden *et al.*, 1986), benzalkonium chloride and quaternary ammonium solutions (Ehrenkranz, Bolyard & Wiener, 1980; Marrie & Costerton, 1981; Sautter, Mattman & Legaspi, 1984), pressure transducers (Donowitz *et al.*, 1979), heparinized solutions (Cleary, MacIntyre & Castro, 1981), handwashing brushes (Anagnostakis *et al.*, 1981), shaving brushes (Whitby, Blair & Rampling, 1972; Wilhelmi *et al.*, 1987), cytosopes (Krieger *et al.*, 1980), vacuum tubes (Blajchman *et al.*, 1979), humidifiers (Crobley, 1978), sweet almond oil with 1% cetavlon (Borderon *et al.*, 1980), I.V. fluids (Daschner & Senska-Euringer, 1975), EDTA tubes (Hoffman *et al.*, 1976), rinse solutions of blood gas apparatus (Ives *et al.*, 1982), fiberoptic bronchoscopes (Siegman-Igra, Inbar & Campus, 1985). To our knowledge this is the first example where ultrasound jelly has given a false positive urine culture obtained by bladder puncture.

**G. Verschraegen**

**D. Voet**

**G. Claeys**

**M. Delanghe**

**H. Van Pelt**

**M. Dierendonck**

*Depts. of Microbiology, Internal  
Medicine, Hospital Pharmacy and  
Hospital Hygiene,  
University Hospital,  
Gent, Belgium*