and reported a correlation of only 74% when the media were incubated under aerobic conditions and 92.5% when the atmosphere was enriched with CO₂. The MICs, as determined by the Etest method, were a mean of one twofold dilution higher when the atmosphere contained CO₂ compared with those determined in air. In contrast, we observed correlations of between 95% and 100%, regardless of the atmospheric condition. Moreover, the numbers of minor discrepancies detected by us were lower than those reported by other investigators.

This study has demonstrated that, when determining the MICs of β-lactams by the agar dilution method, the results are not influenced by the atmospheric conditions during incubation. However, this conclusion cannot be extrapolated to other classes of antibiotics.

References


The use of Sorbarod biofilms to study the antimicrobial susceptibility of a strain of Streptococcus pneumoniae


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ent was collected over 15 min and the numbers of viable planktonic bacteria were determined. Individual Sorbarods were then harvested in 5 mL of BHI broth and vortexed to disintegrate the cellulose matrix and the numbers of viable organisms in the bacterial suspension were determined.5

Steady state growth of the bacteria in the Sorbarods was obtained within 24 h and maintained for at least 96 h. Viable counts in the biofilm vortexate were normally >10^15 cfu/L, while those in the biofilm effluent were c.10^13 cfu/L. After 24 h, individual biofilms were exposed to a single antibiotic concentration in BHI broth for 18 h. The numbers of viable bacteria in the biofilm and biofilm effluent were then determined as described above.5

The MICs and MBCs of the four β-lactams for the pneumococcal isolate, as determined by the broth dilution and Etest methods, ranged from 0.015 mg/L to 0.06 mg/L. The BECs and effluent MBCs were 0.03 mg/L, i.e. the same as, or within one two-fold dilution of, the results obtained by the conventional methods. These observations suggest that biofilms confer no protection against the activities of the antibiotics tested on this particular strain of S. pneumoniae, even when the bacterial numbers in the biofilms are very high. We have demonstrated here that the Sorbarod biofilm model is both simple and well-suited to studying the in-vitro susceptibility of an important respiratory pathogen and allows reproducible growth patterns to be obtained. Moreover, with a 12-channel peristaltic pump, sufficient numbers of Sorbarod biofilms can be employed to cover the same range of concentrations that are used in conventional tests for determining MICs and MBCs, thereby facilitating the determination of the BEC of a particular antibiotic. Placing a T-connector upstream of the biofilm makes it relatively easy to replace BHI as the growth medium with one containing an antibiotic at a defined concentration. Although the Sorbarod method may be labour-intensive, one of its principal advantages is the ease with which the conditions of growth can be altered and antibiotics introduced without disturbing the bacteria growing within the biofilm. The growth conditions within biofilms that are created by this model are therefore more likely to approximate those occurring in vivo than are those that prevail during conventional MIC and MBC studies. We propose that Sorbarods might be useful for determining the BECs of both existing and novel antimicrobial agents for a wide range of bacterial pathogens.

References

A time–kill study to evaluate the in-vitro activity of clofazimine in combination with cefotaxime against a penicillin- and cefotaxime-resistant strain of Streptococcus pneumoniae


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Sir,

Streptococcus pneumoniae is an important cause of both upper and lower respiratory tract infections. In the USA, this pathogen causes 35–45% of episodes of acute otitis media in children,1 and in South Africa, the annual incidence of pneumococcal pneumonia is approximately 2.1 per 1000.2 The incidence of infections caused by strains of pneumococci that are resistant to penicillin, and, more recently, to third-generation cephalosporins such as cefotaxime andceftriaxone has increased at an alarming rate and stimulated an urgent search for alternative therapeutic regimens. The riminophenazine, clofazimine, an agent that is commonly used in the treatment of patients with leprosy, and its analogues, are active against most Gram-positive bacteria. The present study was undertaken to investigate the activity of clofazimine in combination with a cell-wall active agent, cefotaxime, against a penicillin- and cefotaxime-resistant strain of pneumococcus. We chose to use time–kill studies for this purpose in order to assess the bactericidal activities of antibiotic regimes that might be candidates for the treatment of patients with serious pneumococcal infections.