THE ANTIMICROBIAL ACTION OF DEGRADED THIOMERSAL SOLUTIONS

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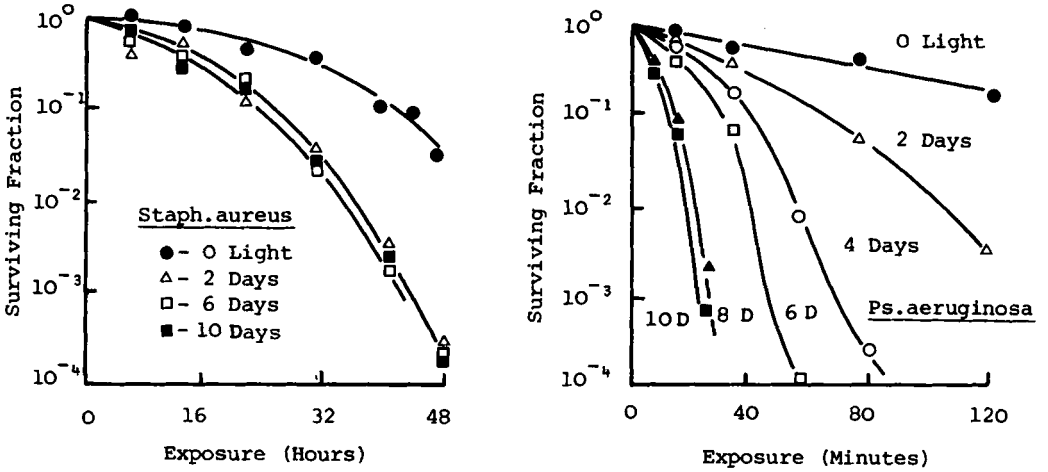
Thiomersal, the sodium salt of ethylmercuri-thiosalicylic acid is widely used as a preservative for aqueous ophthalmic solutions and biological products. Evidence exists which indicates that thiomersal is unstable, particularly in the presence of light (Meakin & Khammas 1978), although there is no evidence of a concomitant decrease in antimicrobial activity. This work was initiated to determine the antimicrobial activity of the degradation products of thiomersal and we now report the initial results of the action of photochemically degraded solutions on the gram positive Staph. aureus NCTC6571 and the gram negative Ps. aeruginosa NCTC6750.

A solution of thiomersal 0.008% $^{w}/_{v}$ in Sørensens phosphate buffer at pH7 was distributed into 10ml glass ampoules and exposed to a high intensity simulated daylight source (Cox 1975) and ampoules were removed after 2,4,6,8 and 10 days for testing. The bacteria were grown in a chemically defined medium and 22 hour secondary growth cultures were harvested, washed and suspended in phosphate buffer. An aliquot was added to the thiomersal solutions to give an initial viable count of about 1 x 10^6 organisms ml^{-1}. Samples were removed at intervals, placed in a recovery medium and assayed for viability. Survivor curves for Staph. aureus and Ps. aeruginosa are shown in the figure.



In both cases the degraded solution is more active than the undegraded, but for the Ps. aeruginosa the activity increases with increasing amount of degradation, presumably because one of the degradation products has specific activity for gram negative organisms. Some clue as to the nature of this active compound is provided by the results obtained when photochemical degradation of thiomersal was carried out in the presence of EDTA. Some slight enhancement of antimicrobial activity did occur for both organisms, but now in both cases less activity was shown by the solutions irradiated for the longer periods. EDTA must, therefore, be removing from solution, the most active antimicrobial compound, possibly by chelation.

Cox, N. (1975), M.Sc., Thesis, University of Bath

Meakin, B.J., Khammas, F.M., (1978), J. Pharm. Pharmacol. 30: 52P

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