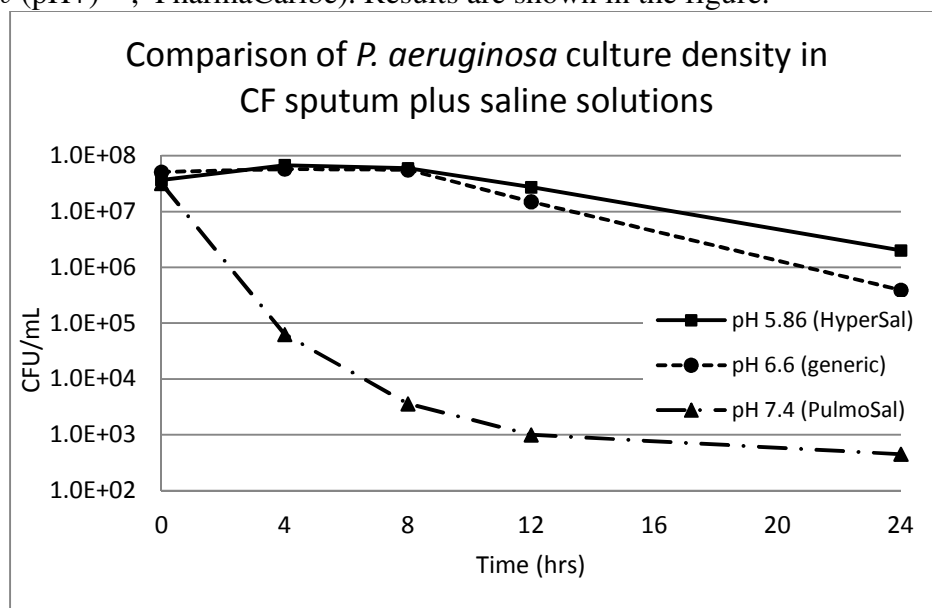


pH-DEPENDENT DIFFERENTIAL *PSEUDOMONAS AERUGINOSA* KILLING IN CF SPUTUM INCUBATED IN HYPERTONIC SALINE SOLUTIONS

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The use of 7% hypertonic saline (7%HS) has proven useful as a mechanism of airway clearance in individuals with CF. A number of studies have demonstrated improved lung function, accelerated mucus clearance, fewer pulmonary exacerbations and a higher percentage of patients without exacerbations. The majority of currently available 7%HS solutions follow USP guidelines and have a pH between 4.5 and 7.0. The average is pH 6.2, although there can be variability between each batch produced by an individual company. A recently released 7%HS solution is pH controlled with a pH of 7.4, which is within the NIH range for physiologic pH in the human lung (pH 7.38 to 7.42), although not within USP guidelines. Based on data in the literature reporting that CF airway surface liquid is acidic, which may contribute to the poor clearance of *P. aeruginosa*, we hypothesized that addition of a 7%HS solution that was physiologic pH would decrease *P. aeruginosa* density over time more than acidic 7%HS solutions. We tested this by performing 24-hour killing curves in sterilized CF sputum that was "spiked" with *P. aeruginosa* PA01 and diluted 10% wt/vol in commercial saline products of differing pH. We used three different 7%HS products: pH 5.86 (HyperSal®, PARI), pH 6.6 (generic 7%HS, Nephron) and pH 7.4 (PulmoSal™7% (pH+)™, PharmaCaribe). Results are shown in the figure.



These data show approximately 5 log decrease in bacterial density in the pH 7.4 solution compared with approximately 2 log decrease in the two other commercially available HS's having pH 5.86 and pH 6.60 solutions at 24 hours. The density difference between solutions is even more dramatic at 8 and 12 hours. These results suggest that a clinical trial designed to determine if increasing the pH of 7%HS reduces microbial density may be warranted. Given the dosing frequency of 7%HS in CF, these findings suggest that the use of physiologic pH+ solution could have a marked impact on bacterial density in CF sputum.

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