

Microbial Evaluation of Preservatives Efficiency by Rapid D-VALUE Test in Cosmetic and Hygienic Industry

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Background & Objectives: The effectiveness concentrations of antimicrobial preservatives are one of the most critical points in formulation of cosmetic products. There are some of standard test methods for determining the efficiency of there. Minimum inhibitory concentration and challenge methods describe for antimicrobial preservatives, considered as a supportive tool for establishing a practical methods for these agents. These standard procedures are very similar in many aspects and suffer from the major disadvantage of being time consuming. The test usually lasts for four weeks and if challenge is required it may take 2 months. Determination of a D-value for specific test organisms could have been a component of the efficacy evaluation of preservatives. This parameter is commonly defined as the time required for the number of surviving microorganisms to decrease one logarithmic unit. The assumption made in establishing a D-value is that the rate of kill exhibits first-order kinetics under the specified conditions.

Methods: In this study we compare four different preservatives include isocil ultra 1.5%, hydrol DP, combination of formalin - isocil ultra 1.5% and formalin-hydrol DP. The solutions were challenged with 10⁸ CFU of the mixture of *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans* to evaluate the suitability of D-value determination in dishwashing.

Results: comparison of the death rate kinetics showed that response of a dishwashing treated with a little amount of formalin combine with isocil or hydrol DP against microorganisms are significantly higher than both isocil and hydrol DP alone.

Conclusion: the D-value, which was calculated from the plot of Log CFU ml⁻¹ versus time by liner regression analysis, could be obtained within 48h. Thus, the time required for the challenge test was reduced from 4-8 weeks with the standard procedures (e.g. U.S. Pharmacopeia), to 2 days with the current methods.

Keywords: Antimicrobial Preservatives; D-Value