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Julia Puschmann, Michael E. Herbig, Christel C. Müller-Goymann

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Title

Correlation of antimicrobial effects of phenoxyethanol with its free concentration in the water phase of o/w-emulsion gels

Authors

Julia Puschmann^{1,2}, Michael E. Herbig², Christel C. Müller-Goymann^{1,3}

¹ Institut für Pharmazeutische Technologie, TU Braunschweig, Braunschweig, Germany

² Almirall Hermal GmbH, Reinbek, Germany

³ Center of Pharmaceutical Engineering (PVZ), TU Braunschweig, Braunschweig, Germany

Abstract

Antimicrobial testing is a time consuming and cost-intensive but essential method for evaluation of newly developed pharmaceutical formulations for topical use. In this study the correlation between free preservative concentration in emulsion gels measured by equilibrium dialysis and the successful preservative effectiveness testing for *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Candida albicans* and *Aspergillus brasiliensis* (analyzed according to Ph. Eur. and USP) was investigated. The higher the lipophilicity of the oil phase and the lower the content of the aqueous phase with regard to dissolved ingredients the more preferably distributed is phenoxyethanol to the water phase and, consequently, the higher was the efficacy against the microbes. Increased emulsifier concentrations reduced the free amount of the preservative due to micellar interactions. *Aspergillus brasiliensis* was the most resistant and *Staphylococcus aureus* the most sensitive germ towards phenoxyethanol in o/w-emulsion gels.

Keywords

Equilibrium dialysis, preservation, microbiological stability, emulsifier, partition coefficient, phenoxyethanol, preservative efficacy testing

Abbreviations

P.a.	<i>Pseudomonas aeruginosa</i>
S.a.	<i>Staphylococcus aureus</i>
C.a.	<i>Candida albicans</i>
A.b.	<i>Aspergillus brasiliensis</i>
MCT	medium chain triglycerides
PE	phenoxyethanol
PEG	Polyethylene glycol

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