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## Formulation and evaluation of antibacterial creams and gels containing metal ions for topical application

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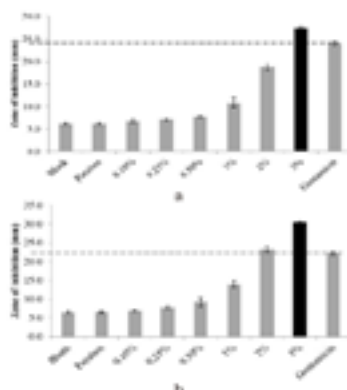
**Background:** Skin infections occurs commonly and often present therapeutic challenges to practitioners due to the growing concerns regarding multidrug-resistant bacterial, viral and fungal strains. The antimicrobial properties of zinc sulfate and copper sulfate are well known and have been investigated for many years. However, the synergistic activity between these two metal ions as antimicrobial ingredients has not been evaluated in topical formulations.

**Objective:** The aims of the present study were to formulate topical creams and gels containing zinc and copper alone or in combination and to evaluate the physicochemical properties of the formulations and in vitro antibacterial activity in the formulations.

**Methods:** Formulation of the gels and creams was followed by evaluating their organoleptic characteristics, physicochemical properties and in vitro antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*.

**Results:** Zinc sulfate and copper sulfate had a strong synergistic antibacterial activity in the creams and gels. The minimum effective concentration was found to be 3 w/w% for both active ingredients against the two tested microorganisms.

**Conclusions:** This study evaluated and confirmed the synergistic in vitro antibacterial effect of copper sulfate and zinc sulfate in a cream and two gels.



**Figure:** Antimicrobial activity of the selected cream containing copper sulfate and zinc sulfate in various concentrations against (a) *E. coli* and (b) *S. aureus* (n=3, results are shown as mean  $\pm$ SD) ( $p=0.05$ ).

### Biography

Gabriella Baki is an Assistant Professor at the University of Toledo College of Pharmacy and Pharmaceutical Sciences. She serves as the Program Director and main Instructor in the BSPS Cosmetic Science and Formulation Design. She is a Pharmacist, graduated in 2008 from the University of Szeged, Hungary and also did PhD from the same university. Her research area focuses on cosmetics and personal care products as well as topical pharmaceutical products with the ultimate goals of enhancing consumer experience, patient adherence as well as product appeal and performance. She has made several technical presentations and over a dozen poster presentations. She has written 24 publications, has contributed to book chapters and had her first book, *Introduction to Cosmetic Formulation and Technology*, published by John Wiley and Sons last year.

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