

# FORMULATION AND EVALUATION OF ANTIBACTERIAL PHYTOTHERAPEUTIC GELS CONTAINING METAL IONS AND ESSENTIAL OILS

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## Abstract

The purpose of this study was to develop topical phytotherapeutic gels containing essential oils alone or in combination with copper ions and to assess their antibacterial activity in vitro. Following the formulation of the gels, the organoleptic properties, physicochemical properties, and in vitro antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* were evaluated. Copper sulfate demonstrated strong synergistic antibacterial activity when combined with the selected essential oil blend. This preliminary study assessed and confirmed the synergistic antimicrobial properties of sulfate copper and essential oils in phytotherapeutic formulations with topical applications.

**Key words:** phytotherapeutic gel; essential oils; metal ions; copper sulfate

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