



The Study of an Optimal Ratio for Liquid Plaster with Antibacterial Activity Against *Staphylococcus aureus* Using Galangal Essential Oil Extract.

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Abstract

Acute wounds located in areas of frequent movement and in regions with limited surface area for applying sheet-type plasters present challenges for protecting the wound from environmental exposure. This is especially true for small wounds or those situated in hard-to-reach areas such as periungual regions or finger joints, which are also at increased risk of infection from skin microorganisms. This study aimed to develop a liquid bandage containing galangal essential oil that can form a conformable, flexible wound-sealing film with antimicrobial activity against *Staphylococcus aureus*. Liquid bandage formulations were prepared using ethanol, ethyl acetate, polyvinyl butyral, polyvinylpyrrolidone, and polyethylene glycol 400. Galangal essential oil was incorporated at concentrations of 20%, 30%, and 40%. The physical properties including viscosity, water permeation, drying time, and contact angle were evaluated, along with the antimicrobial efficacy of the galangal essential oil. The results demonstrated that the formulation containing ethanol : ethyl acetate : polyvinyl butyral : polyvinylpyrrolidone : polyethylene glycol 400 in the ratio 58 : 30 : 10 : 2 : 0 exhibited a viscosity of 162.8 MPa·s, water permeation of 0.078 g/day, a drying time of 7.83 minutes, and a contact angle of 53 degrees, closely resembling the physical characteristics of commercial products. Additionally, inhibition of *Staphylococcus aureus*



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growth was achieved with only 20% galangal essential oil. It can be concluded that the liquid bandage containing galangal essential oil provides effective wound sealing and shows antibacterial activity against *Staphylococcus aureus*.

Keywords: liquid bandage, galangal essential oil, *Staphylococcus aureus*, film physical properties, antimicrobial activity