

Abstract ID: 023

Formulation of novel alcohol based hand scrubs with medicinal plant extracts and evaluation of the antimicrobial efficacy

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The aim of the study is to develop alcohol based hand scrubs using natural plant extracts and evaluate the antimicrobial efficacy against selected microorganisms. Two types (F1 and F2) of alcohol based herbal hand scrubs with medicinal plant extracts were prepared. F1 formulation was prepared by the combination of clove oil and medicinal aloe while the F2 formulation was prepared by the combination of cinnamon oil and medicinal aloe as the herbal extracts. 70% aqueous ethanol and market product were used as positive controls whereas distilled water and glycerin were used as negative controls. Health Care Professionals were randomly selected and tested to identify the viable pathogens which are present on hands. Agar well diffusion method was performed against standard cultures of microbes to evaluate in vitro antimicrobial efficacy of hand scrubs formulated. The physical stability parameters (pH, odor, appearance and colour) were measured for 90 days at room temperature. The identified microorganisms were *Shigella sonnei*, *Candida albicans*, and *Streptococcus pyogenes*. The formulated hand scrubs were found to be homogenous, liquid and pale yellowish colour with pleasant odor. The mean values of zones of inhibition of F1 were 17.00±3.00 mm, 34.70±1.15 mm and 20.30±0.58 mm against *Shigella sonnei*, *Candida albicans*, and *Streptococcus pyogenes* respectively. The mean values of zones of inhibition of F2 were 10.33±0.58 mm, 18.00±1.00 mm and 10.33±0.58 mm against *Shigella sonnei*, *Candida albicans*, and *Streptococcus pyogenes* respectively. Zero values were obtained for the zones of inhibition for distilled water, glycerin and 70% aqueous ethanol against the microorganisms tested. The market product showed the zones of inhibition of 11.30±2.31 mm, 12.00±1.73 mm and 10.30±0.58 mm against *Shigella sonnei*, *Candida albicans*, and *Streptococcus pyogenes* respectively. Therefore, it is concluded that the formulated alcohol based hand scrubs are having promising antimicrobial activity against the selected microorganisms.

Keywords: Alcohol based hand scrubs, clove oil, cinnamon oil, medicinal plant extracts, microorganisms