

Abstract

Background and aim: Acne vulgaris, a common skin condition, is influenced by many factors including *Propionibacterium acne* (*P. acne*) and *Staphylococcus aureus* (*S. aureus*). Curcuma zedoria contains curcumin which has antibacterial properties; curcumin can be extracted using deep eutetic solvent (DES), a relatively recent extraction method. This study aims to optimize the extraction of curcumin from curcuma zedoria using citric acid-ethylene glycol (CA-EG) and lactic acid-glycine (LA-G) based (DES) and determine its antibacterial effect on bacteria related to acne vulgaris.

Experimental procedure: The extraction will be optimized according to time (16hrs, 20hrs, 24hrs), solvent feed ratio (5,7,9ml/10mg), and speed (100, 200, 300rpm) using a central composite design. The optimized extract will be tested for its antibacterial properties against *P. acne* and *S. aureus* using the agar well diffusion method. The extract will also be analyzed using GCMS.

Results and Conclusion: The result showed that S/F ratio ($p < 0.05$) had an impact on both DES, but time ($p < 0.05$) only had an impact on CA-EG. The expected optimal yield for curcumin extraction for CA-EG is 13.3 mg curcumin/g curcuma zedoria (20.202 hours, 200 rpm, and 0.9 S/F ratio); and 13.8 mg for LA-G (20.465 hours, 600 rpm, and 0.9 S/F). The DES also showed statistically significant (ANOVA and Turkey Post-Hoc test) antibacterial activities on *P. acne* and *S. aureus* with a mean inhibition zone similar to clindamycin (24.4 mm) in DES extracts with a concentration of 100% with each DES more effective in different bacterium: CA-EG on *P. Acne* (25.83 mm) and LA-G on *S. Aureus* (22.46mm). The GCMS showed that the extract contain curcuminoids and eucalyptol which both have antibacterial effects.