

ABSTRACT

The skin is a vital organ that protects the body from external factors. Excision wounds penetrating the dermis are highly susceptible to infection and require therapies that accelerate healing. Curcumin exhibits anti-inflammatory, antioxidant, and antibacterial activities, yet its low bioavailability limits clinical application. This study aimed to formulate curcumin into nanoemulsion, nanoemulsion gel, and nanoemulsion cream, and to evaluate their physicochemical characteristics, antioxidant activity, antibacterial activity, release profile, and wound healing efficacy in mice excision models. The nanoemulsion was prepared using VCO, tween 80, and PEG 400, then developed into gel with CMC-Na and cream with cetyl alcohol. Characterization showed curcumin nanoemulsion had droplet size of 6,556 nm, 99,27% transmittance, and pH 5,43. Both gel and cream were physically stable with pH 6,54 and 6,49, respectively. Antioxidant assay revealed strong activity with IC₅₀ of 28,32 ppm and 65,49% inhibition. However, the nanoemulsion showed no antibacterial activity against *S. aureus* and *E. coli*. Franz diffusion test indicated higher release from nanoemulsion gel (16,31%) than cream (15,1%). Both formulations accelerated excision wound healing, with the gel achieving the highest effectiveness (99,73%) compared to cream (99,65%). These findings suggest that curcumin nanoemulsion gel holds potential as a topical therapeutic candidate for wound healing.

Keywords: curcumin, nanoemulsion, gel, cream, excision wound.