

## عنوان مقاله:

Antibacterial curcumin-loaded hydrogel based on Hyaluronic Acid-Polydimethylsiloxane (HA-PDMS) for wound dressing perspectives

## محل انتشار:

بیستمین کنگره بین المللی میکروب شناسی ایران (سال: 1398)

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## خلاصه مقاله:

**Introduction and Objective:** Several studies indicate the antibacterial effect of curcumin. The aim of this study was to synthesis a novel curcumin-loaded composite hydrogel based on HA-PDMS and evaluation the antibacterial potential of it. **Materials and Methods:** HA was cross-linked with polydimethylsiloxane-diglycidyl ether terminated (PDMS-DG) in alkaline condition, for 2 hours at 37°C. Cross-linking was between OH (from HA) and epoxy, leading to the ether bond formation. Immediately, curcumin solution was added to the resulting hydrogel (hydrogel A) or added after about 2 days to the semi dried hydrogel (hydrogel B) and then the hydrogel kept in dark. Room temperature dried curcumin-loaded hydrogels were characterized using NMR and swelling analysis. Antibacterial activity of the curcumin-loaded hydrogels was investigated against *Pseudomonas aeruginosa* PAO1 using the disk diffusion and bactericidal efficiency (10 mg of each hydrogel in a 2 ml bacterial suspension at 10<sup>6</sup> CFU/mL) methods. **Results:** HA-PDMS hydrogel was a transparent hydrogel with vial inversion property. Loading with curcumin, changed the color of the hydrogel to red and orange for hydrogel A or B, respectively. NMR analysis showed that the HA-PDMS hydrogel and curcumin-loaded hydrogels were synthesized successfully. Swelling assay showed the high water uptake capacity for the hydrogels. According to disk diffusion test on Mueller Hinton agar, 10 mm inhibition zone around the curcumin-loaded hydrogels was observed against *P. aeruginosa*. Also, bactericidal efficiency test revealed 39.28%, 57.14% and 14% inhibition in *P. aeruginosa* growth in the presence of curcumin-loaded hydrogel A, curcumin-loaded hydrogel B, and HA-PDMS pure hydrogel, respectively. **Conclusion:** Based on these data, loading with curcumin increased the antimicrobial effect of the HA-PDMS hydrogel. Moreover, curcumin-loaded hydrogel B has the most antimicrobial effect and can be proposed as a wound dressing material.

## کلمات کلیدی:

Hyaluronic acid, PDMS-DG, Curcumin, Antibacterial hydrogel

