

**HYDROGEL COMPOSITES LOADED WITH PLANT EXTRACT  
AS AN ANTIBACTERIAL AND QUORUM SENSING  
INHIBITING WOUND DRESSING**

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## ABSTRACT

Delayed wound healing is often caused by bacterial infection. Furthermore, the persistent inflammation brought by the formation of biofilm via quorum sensing causes pain and discomfort. In a novel effort, this study fabricated an antibacterial and quorum sensing inhibiting hydrogel dressing loaded with plant extracts. KC-PVP hydrogel composites were loaded separately with 1g/mL *C. longa* and *H. durvillei* extract under optimized conditions. The hydrogels were characterized through swelling test and FTIR analysis. It was determined that *C. longa*-loaded and *H. durvillei*-loaded hydrogels have a maximum swelling capacity of 175% and 135%, respectively. The antibacterial efficacy and the quorum sensing inhibition activity of extract-loaded hydrogels were evaluated using soft-layer agar well diffusion method. Hydrogel loaded with *C. longa* extract displayed 47.0 ( $\pm 1.0$ ), 45.0 ( $\pm 1.0$ ), and 32.33 ( $\pm 0.58$ ) mm mean growth inhibition against *S. aureus*, *E. coli*, and *P. aeruginosa*, respectively. *H. durvillei* extract-loaded hydrogels inhibited the growth of *S. aureus*, *E. coli*, and *P. aeruginosa* by 45.33 ( $\pm 0.58$ ), 43.67 ( $\pm 1.52$ ), and 33.33 ( $\pm 0.58$ ) mm in diameter, respectively. The quorum sensing inhibition zone of *C. longa* extract and *H. durvillei* extract-loaded hydrogels were 49.63 ( $\pm 0.40$ ) and 49.37 ( $\pm 1.11$ ) mm diameter, respectively. Overall, the extract-loaded hydrogel composites exhibited good antibacterial and quorum sensing inhibiting activity potentially for wound treatment.