Title : Preparation and Characterization of Sodium 2-acrylamido-2-methylpropane sulfonate/Hemp Fiber Hydrogel For Use as Wound Dressing

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Type of presentation :

- ☐ **Oral Presentation**
- ☑ **Poster**
- ☐ **Cooperative Education**

ABSTRACT

This research aims to study the preparation of hydrogel sheets for wound dressing applications. The hydrogels were synthesized from sodium 2-acrylamido-2-methylpropane sulfonate (Na-AMPS) combined with bleached and non-bleached hemp fibers at amount of 1, 2, 3, and 4% by weight of Na-AMPS. The synthesis was carried out through free radical polymerization under ultraviolet (UV) radiation, using 2-hydroxy-4'-(2-hydroxyethoxy)-2-methylpropiophenone as the photoinitiator and trimethylolpropane triacrylate as the crosslinking agent. The structure of the synthesized hydrogel sheets was confirmed using Fourier-transform infrared (FTIR) spectroscopy. The water-related properties of the hydrogels were examined by evaluating water content and swelling ratio. The results indicated that increasing the fiber content did not affect the water content of the hydrogel sheets. However, it led to a reduction in swelling ratio for both fiber types. The mechanical properties of the hydrogel sheets were analyzed through tensile testing, revealing that increasing the content of bleached fibers resulted in higher strain values. However, increasing bleached and non-bleached fiber contents increased stress and modulus values. Additionally, rheological shear testing indicated an increase in storage modulus, suggesting that hydrogels containing bleached hemp fibers exhibited improved stiffness and elasticity. The hydrogel sheets containing 1% bleached hemp fibers by weight of Na-AMPS were further incorporated with diclofenac drug. After 60 minutes, the 3 cm x 3 cm x 0.6 cm hydrogel sheet absorbed 54.73 mg of diclofenac drug. Additionally, an application suitability test using a fluid affinity test confirmed that the synthesized hydrogel sheets were appropriate for use on moist wounds. It can be concluded that the bleached hemp fibers can enhance the mechanical properties of the

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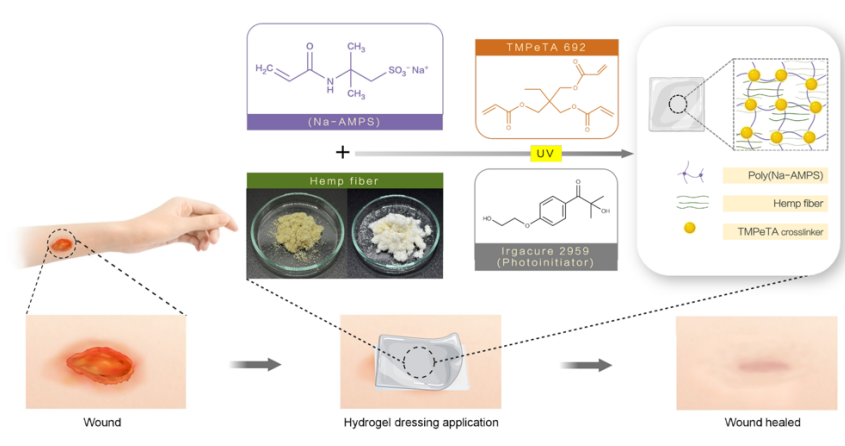
hydrogel. In addition, the prepared hydrogel can be incorporated with diclofenac drug and has the potential for further development as wound dressing materials.



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