

# Bioengineering of Hydrogels for Smart Wound care

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## **Abstract**

Polymeric materials, especially hydrogels and hydrocolloids have been a boon to human healthcare due to their very innovative and beneficial life support features. However, the development of such materials requires a close collaboration between medicine, microbiology and materials chemistry. The development of polymers with bioactive coating is an important area of research focused on solving the problem of contamination by infection in wound care systems. We have observed that a bioactive component may be incorporated within the hydrogel matrix to make it infection resistant. A series of hydrogels based on polymethacrylic acid, polyvinyl alcohol, chitosan, pectin and dextran have shown enormous potential in wound care system. These hydrogels may be combined with appropriate ingredients to develop a system which would offer optimum healing to the wound. Herbal bioactive agents have been used for this application.

Herbal drugs and essential oils may be incorporated into either natural hydrogels like chitosan, pectin, dextran and carboxymethyl cellulose by blending approach. A wide range of natural bioactive agents such as aloe vera, curcumin, sandal wood oil, clove oil and honey are available to develop excellent materials for wound care. These dressings have been evaluated for their efficiency in wound healing using mouse as the animal model. Excellent healing with minimum scar by hydrogel dressings have been observed with a complete control over the infection on the wound site.

## **Keywords:**

Hydrogels, Antimicrobial, Wound care, Bioactive

## References

1. S. Anjum, A. Arora, MS Alam, B. Gupta, *Int J Pharm*, 2016, 92, 508.
2. S. Anjum, A. Gupta, D. Sharma, A. Kapil, A. Sharma, B. Gupta, *Mat. Sci. Eng. C*. 2016, 64, 157.