# Bioactive Hydrogel Wound Dressings Incorporating Egg White Proteins and Polysaccharides Developed through Radiation

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Wound healing is a complex process involving the coordinated action of cytokines, growth factors, blood components, and the extracellular matrix.[1] Disruptions in these mechanisms, often linked to conditions such as diabetes, can impair healing and lead to chronic wounds. Persistent inflammation in chronic wounds prevents proper tissue regeneration and increases the risk of severe infection and possible amputation.[2]
Hydrogel wound dressings can be produced by radiation-induced crosslinking of polymers such as polyvinyl alcohol (PVA) or polyvinylpyrrolidone (PVP).[3] This method eliminates the need for chemical initiators and simultaneously ensures sterilization. Radiation-crosslinked hydrogels are also transparent, an advantageous feature for wound monitoring. When combined with polysaccharides, such as k-carrageenan and xyloglucan, these materials may further enhance healing due to antioxidant fragments generated during irradiation.[3] Besides, egg white proteins, including ovalbumin and lysozyme, have attracted attention due to their antioxidant and antimicrobial properties.[4] These bioactive molecules can be incorporated into wound-dressing materials to reduce oxidative stress and bacterial contamination, thereby supporting the healing process.
This study aims to develop novel hydrogel formulations based on blends of synthetic polymers and polysaccharides incorporating egg white proteins and/or their derived peptides for advanced wound-dressing applications (Figure 1). The resulting hydrogels were evaluated in terms of rheological behavior, adhesion, fluid retention capacity, morphology, protein release, and antibacterial and antioxidant activity to assess their suitability as wound dressings.

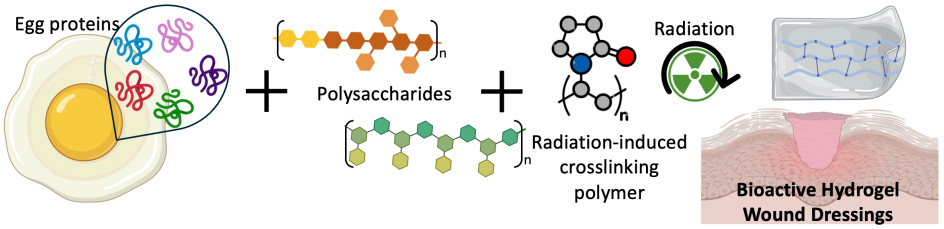


**Figure 1**. Schematic representation of wound dressing components.

## References

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