

Preparation and characterization of novel eggshell membrane-chitosan blend films for potential wound-care dressing: From waste to medicinal products

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Abstract: A series of different eggshell membrane (ESM) and chitosan (CS) blend films (ESM/CS) were prepared for wound-care dressing. The appearance, transparency and microstructure of the films were characterized. Several wound care-related properties such as the film integrity in solution, pH, protein (BSA) and wound fluid absorption capacity as well as the antibacterial property of ESM/CS films were evaluated. The blend films were more stable than CS film after 95 hours of incubation in solution. The integrity of the blend films improved significantly at the cost of a small insignificant decrease in wound fluid absorption capacity. Besides, the blend films provided an acidic environment (pH = 5.86) for wound healing. The swelling properties of ESM contributed significantly to the increase of BSA absorption capacity of the blend films (from 46.57 mg/g of CS film to 61.07 mg/g of blend film) and helped absorb more nutrients to promote the proliferation and migration of fibroblasts. Addition of CS to ESM also enhanced the antibacterial activity of the films significantly. The results indicated that the EMS/CS blend films with 0.01 g ESM/mL CS solution showed the highest high potential to be used as a wound-care dressing for humans as well as animals.

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