Spectroscopic, Molecular docking studies on cellulose acetate: polyvinylidene fluoride as flexible film scaffold for wound healing

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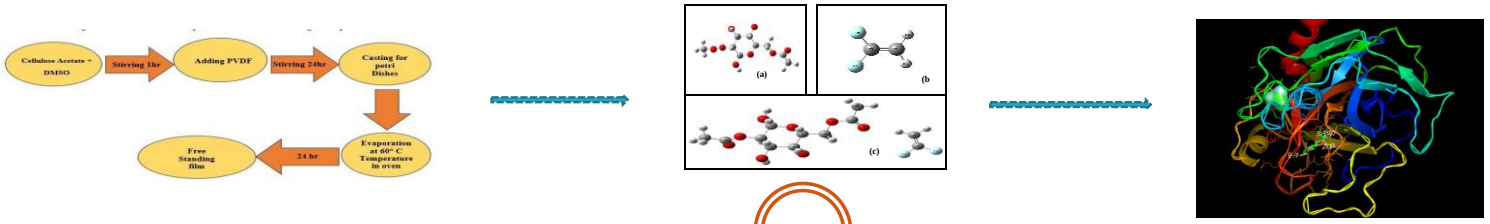

Abstract

Recently extensive research works are going on scaffold based on wound healing and drug release materials. In the present work, cellulose acetate : polyvinylidene fluoride polymer film was prepared to access its drug release activity against wound healing. Polymer film was developed by solution casting technique utilizing the materials of cellulose acetate (CA), polyvinylidene fluoride (PVDF) and deep eutectic solvent (DMSO)., The change in FTIR peaks upon varying the PVDF content in CA: PVDF shows the complexation. This complexation results in the collapse of CA matrix semi crystallinity observed from the reduced intensity of XRD diffraction peaks. The molecular docking study of CA:PVDF against wound healing proteins 1MKW, 3OSL The CA : PVDF is found to be as a potent wound healing material

Materials and method

Solution Casting is a simple and easy method to prepare polymer films. In this method the host polymers and doping material are dissolved in a suitable solvent and stirred well to obtain a homogeneous mixture. The resulting viscous solution is poured onto a petri dish and allowed to evaporate at 60°C for 24 hours. This procedure provides mechanically stable, free standing and flexible films. The films are further vacuum dried for the required time to remove any trace of solvent.

Reference

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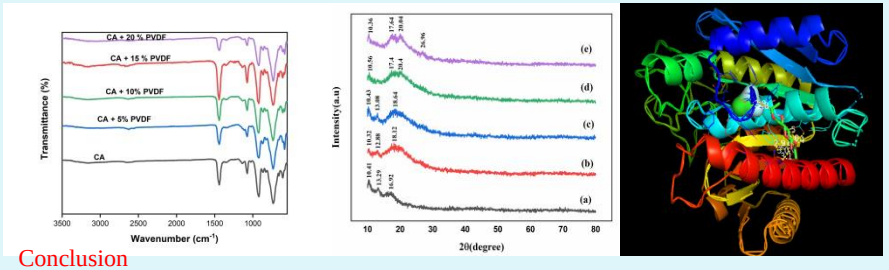
Background

CA has built in characteristic such as tough biocompatibility, relatively easy availability, renewable raw material, economically cost effective and eco-friendly. Due to low toxicity and high compatibility CA membranes are suitable for cell culture, drug delivery, tissue engineering, removal of toxins from solutions, bio-processing and medical filtration. PVDF is a widely used polymer material for fabricating microfiltration membranes due to its excellent chemical resistance, well-controlled porosity, and good thermal and mechanical properties. However, the highly hydrophobic property of PVDF renders the low permeability and poor antifouling ability of microporous PVDF membranes. The resulting CA : PVDF composite films were investigated using the FT-IR, X-ray diffraction analysis. The molecular docking tools can lead to pharmacological study to improve assortment and determination to address particular queries regarding biological or behavioural treatments.



Conclusion

The CA : PVDF film was successfully prepared by solution casting technique. The interaction of CA and PVDF was confirmed using FTIR and X-RD calculations. Our findings indicate that the sample containing CA : 15 % PVDF is significantly more stable and flexible than the others. Overall, our analysis highlights the significant potential of the CA : PVDF molecule for further medical development