

Type of manuscript: Article

Title: A novel fabrication of thermally-enhanced heterogeneous saponified PVA/pullulan blend film from PVAc/pullulan blend film for improved wound healing application

Journal: International Journal of Molecular Sciences

This manuscript presented the fabrication of a new PVA/pullulan blend film via the heterogeneous saponification process of PVAc/pullulan blend film. The study employed various characterization methods to confirm the successful preparation of these saponified blend films and assessed their properties. Through *in vivo* wound healing tests, the effectiveness of these blend films in wound treatment was demonstrated, showing promise for practical applications. However, the manuscript requires major revision before publication in the International Journal of Molecular Sciences. The issues requiring careful consideration by the authors are outlined as follows:

1. The authors must ensure strict adherence to journal guidelines for formatting throughout the manuscript, encompassing decimal formatting, capitalization, subscript/superscript usage, and consistent notation (e.g., Fig. or Figs., 72h or 72 h, 50°C or 50 °C).
2. The authors should emphasize the advancements in preparing blend films for wound healing and elucidate the advantages and disadvantages in the introduction section. The authors must also articulate how this work's blend film addresses these concerns.
3. The authors mentioned a more surface roughness of the saponified films, confirmed by AFM and SEM, resulting in their improved wound healing performances. A detailed discussion on the mechanism causing increased surface roughness post-saponification and its impact on wound healing is required.
4. The appearance of additional XRD crystalline peaks and their variations with different blend ratios require thorough explanation and discussion, particularly regarding pullulan crystallization.
5. In section 2.5, discrepancies in the reported saponification degree (DS) require correction and clarification (98% in the text, whereas 99.5% in Figure 5(d)), specifically addressing variations observed in the ¹H-NMR spectra.
6. PVA without crosslinking is of moisture-sensitive material. The manuscript should address the moisture stability of the hydrophilic PVAc/pullulan blend films for their practicality in wound healing applications.
7. Surface roughness increasing surface area was mentioned for improved wound healing performances. From this point of view, the extreme unevenness observed in PVAc/PULL 70/30 warrants consideration concerning its impact on wound healing performance, and it should also be considered in this work.
8. In the experimental and characterization parts, the authors focused only on the saponification condition of 72 h 50 °C. However, in the *in vivo* wound healing tests, the various saponification times of 24-120 h were considered. The discrepancy between saponification times in characterization and *in vivo* tests needs rectification to ensure the test results align with the characterized properties of the blend films.

Overall Recommendation: Major revision