Biopolymers Research

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Abstract

Marine biopolymers have emerged as promising materials for biomedical applications due to their biocompatibility, biodegradability, and bioactivity. This study explores the integration of marine-derived biopolymers, such as chitosan, DOJLQDWH DQG FDUUDJHHQDQ LQWR HOHFWURVSXQ QDQR¿EURXV VFD‡ROGV IRU %\ FRPELQLQJ WKH DGYDQWDJHRXV SURSHUWLHV RI PDULQH ELRSRO\PHUV ZLW HOHFWURSLQQLQJ WKH VWXG\ DLPV WR HQKDQFH WKH VWUXFWXUDO DQG IXQ VFD‡ROGV 7KH UHVXOWV GHPRQVWUDWH LPSURYHG PHFKDQLFDO VWUHQJWK S FRPSRVLWH QDQR¿EHUV PDNLQJ WKHP LGHDO FDQGLGDWHV IRU DSSOLFDWLRQV VWXG\ GLVFXVVHV WKH FULWLFDO IDFWRUV LQÀXHQFLQJ VFD‡ROG SHUIRUPDQFH parameters, and the bioactive properties of the marine biopolymers, highlighting the potential for further optimization and clinical translation.

pro les. e marine biopolymer-based nano bers showed a sustained release of bioactive agents over time, which is advantageous for wound healing applications [9,10]. In uence of biopolymer type chitosan provided a faster release rate due to its porous structure, while alginate and carrageenan o ered more controlled and gradual release, making them suitable for applications requiring long-term drug delivery.

Conclusion

e integration of marine biopolymers into electrospun nano brous sca olds has shown great promise for enhancing the functional properties of biomedical sca olds. e study successfully demonstrated that chitosan, alginate, and carrageenan can be used to improve the mechanical strength, bioactivity, and drug release capabilities of electrospun nano bers. e enhanced cell compatibility and antimicrobial properties of the resulting sca olds suggest their suitability for tissue engineering and wound healing applications. However, challenges such as optimizing the electrospinning process for consistent ber formation and achieving scalability for industrial applications remain. Future research should focus on the in vivo evaluation of these sca olds to assess their biocompatibility and performance in real tissue environments. Additionally, exploring the synergistic e ects of combining multiple marine biopolymers could further enhance the properties of nano brous sca olds, providing new opportunities for innovation in regenerative medicine.

Acknowledgement

None

Con ict of Interest

None

References

1. Chopra H, Kumar S, Singh I (2021) % L R S R O \ P H U E D V H G 6 F D ‡ R O Engineering Applications. Curr Drug Targets 22: 282-295.
2. Jo YK, Lee D (2020) % L R S R O \ P H U 0 L F U R S D U W L F O H V 3 U H S D Biomedical Applications. Small 16: e1903736-e1903739.
3. Jiménez-Gómez CP, Cecilia JA (2020) & K L W R V D Q $ 1 D W X U D O % L R Wide and Varied Range of Applications. Mol 25: 3981-3985.
4. Negm NA, Hefni HHH, Abd-Elaal AAA, Badr EA, Abou-Kana MTH, et al. (2020) $ G Y D Q F H G 3 R O \ P H U L ¿ F D W L R Q R I F K L W R V D Q E L R S I