Preparation and Characterization Chitosan/Hydroxyapatite Composites from Waste for Bio-applications

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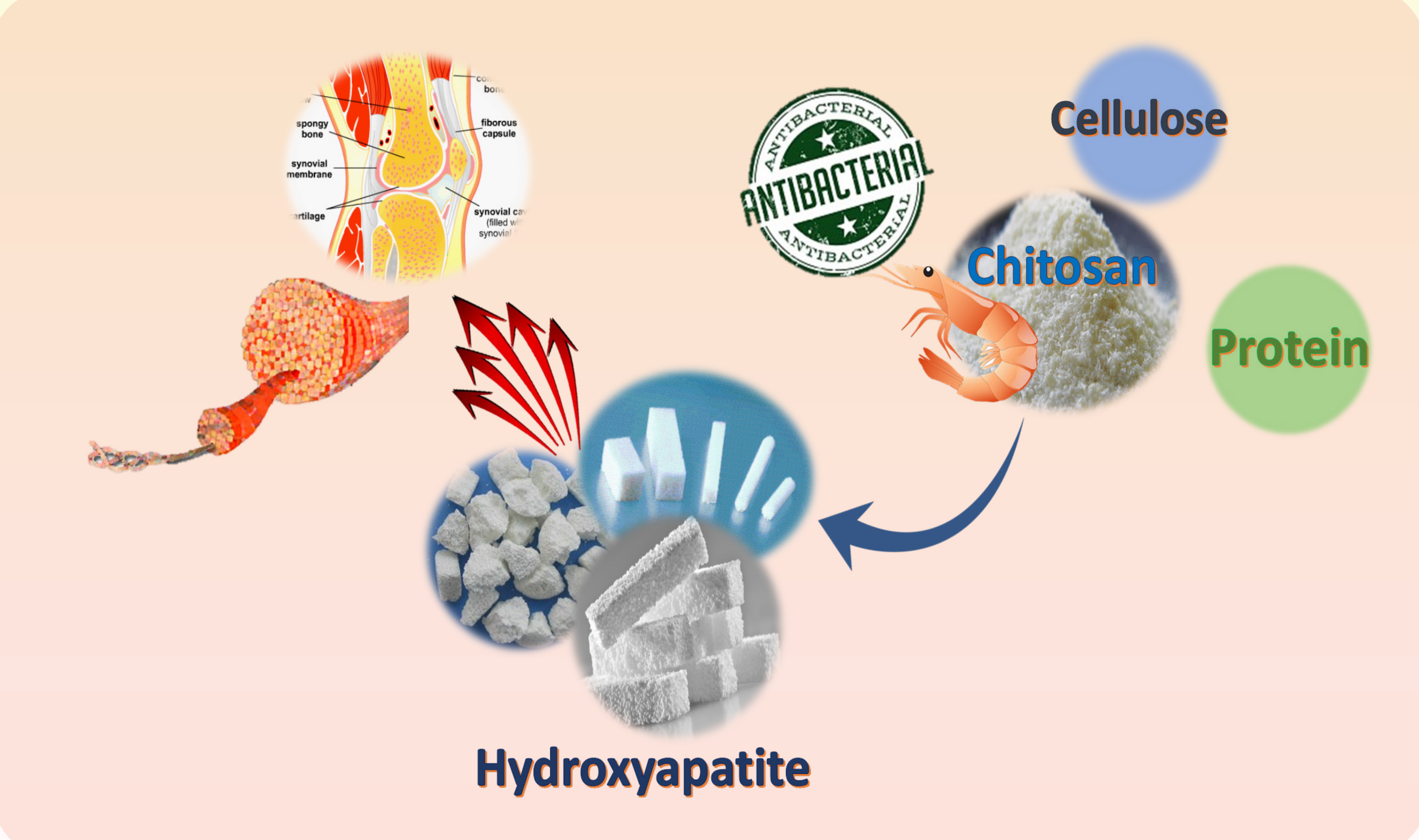
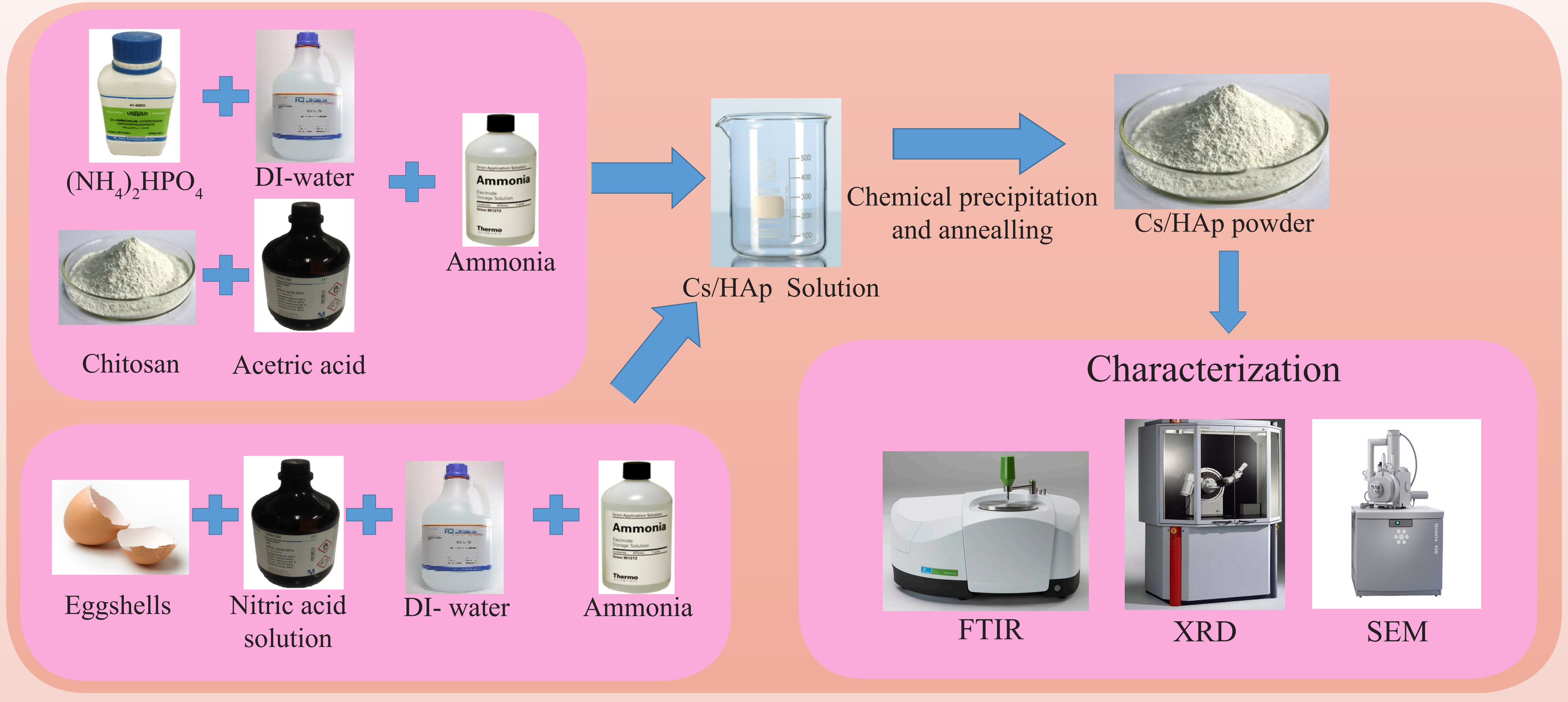
Abstract

In this research, chitosan/hydroxyapatite (Cs/HAp) composites were prepared using precipitation method. The calcium oxide from waste chicken egg shells as a calcium source was mixed with nitric acid. Chitosan of shrimp solution different percent weight from 1 -15 were added to phosphate solution. The both of the solution were mixed, stirred for 6 h, precipitate forming a Cs/HAp composite and annealed at 100 °C for 4 h. The structure properties and morphologies of composites were investigated by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The results showed that the crystal structure of composites was decreased with increased percent weight of chitosan. FTIR was used to investigate the major transmitting bands of all Cs/HAp. The amounts of chitosan were increased as increased the particle size of composites. These experiments showed that the chitosan can be mixed into hydroxyapatite for material.

Introduction



Experiment



Results and discussion

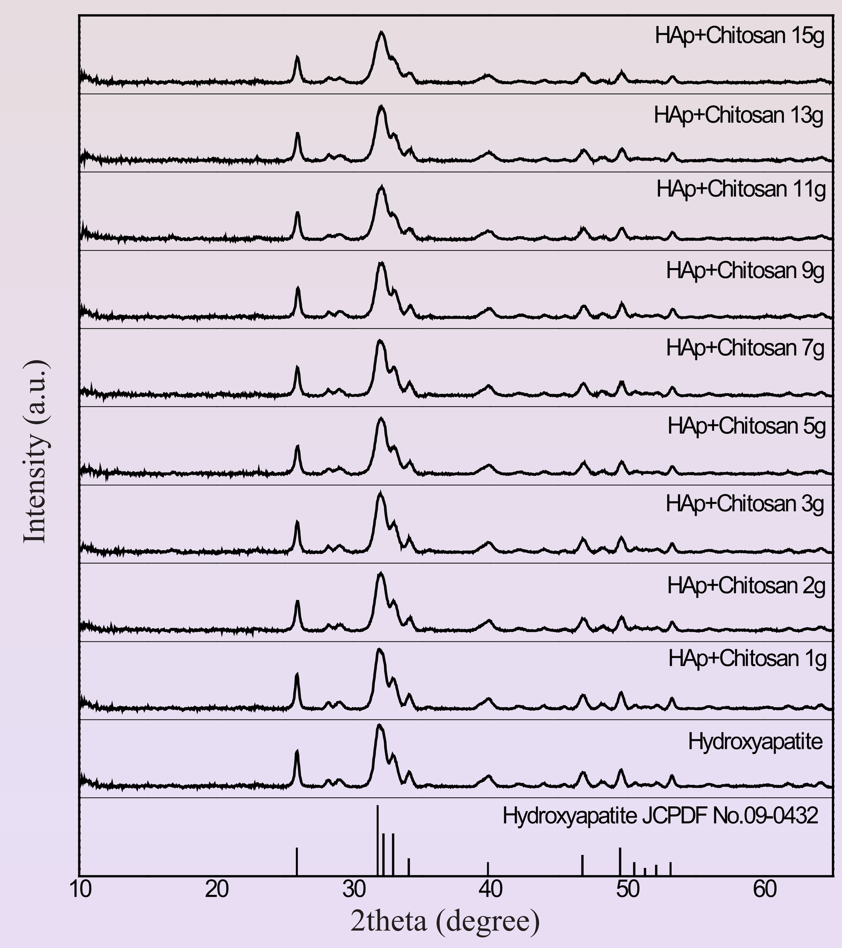


Figure 1. The XRD patterns of hydroxyapatite mixed various chitosan concentration.

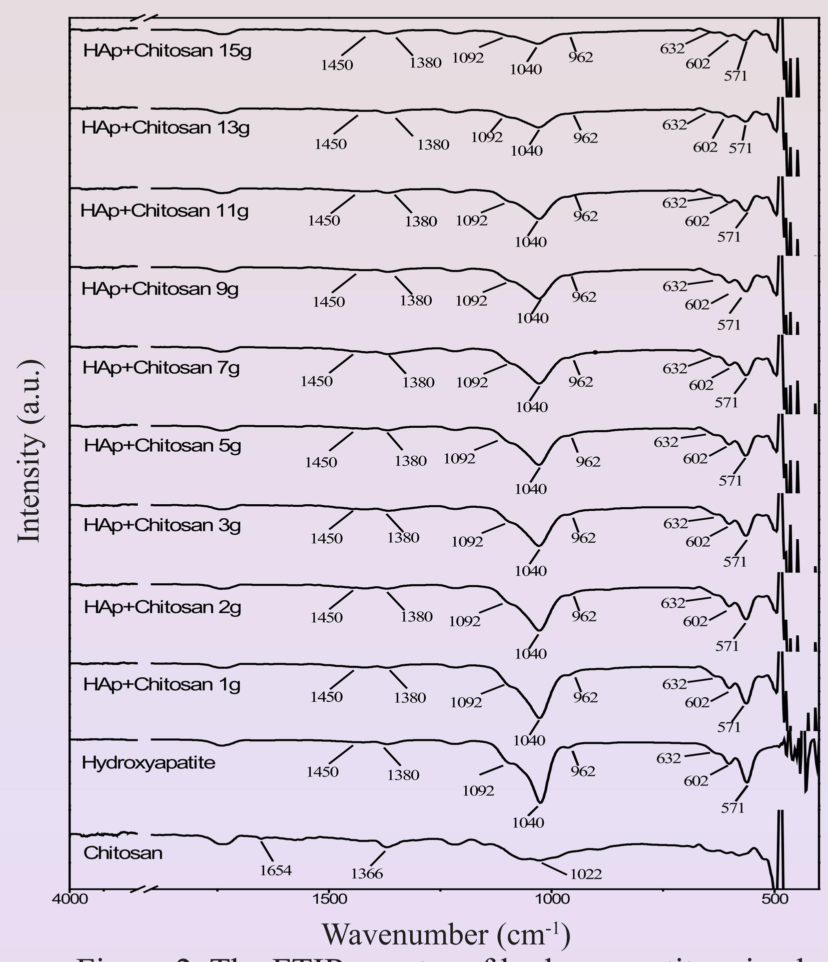


Figure 2. The FTIR spectra of hydroxyapatite mixed various chitosan concentration.

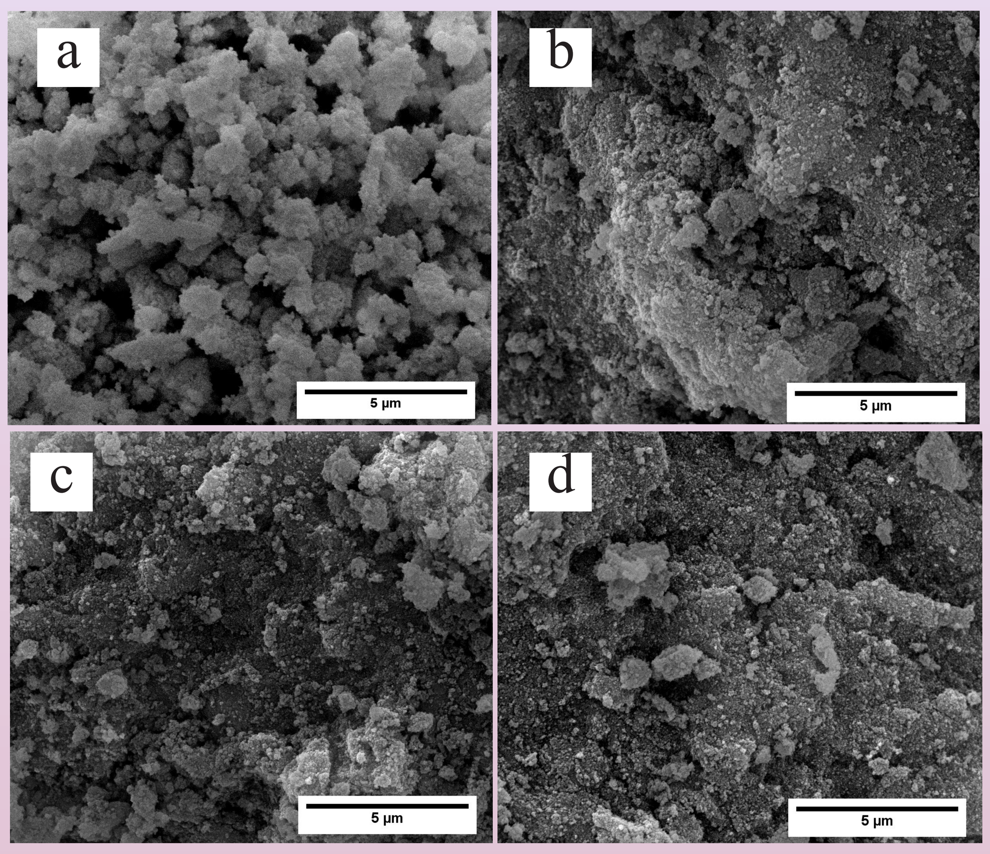


Figure 3. The SEM micrograph of sample (a) pure hydroxyapatite, (b) Cs/HAp 1 g, (c) Cs/HAp 7 g, (d) Cs/HAp 15 g.

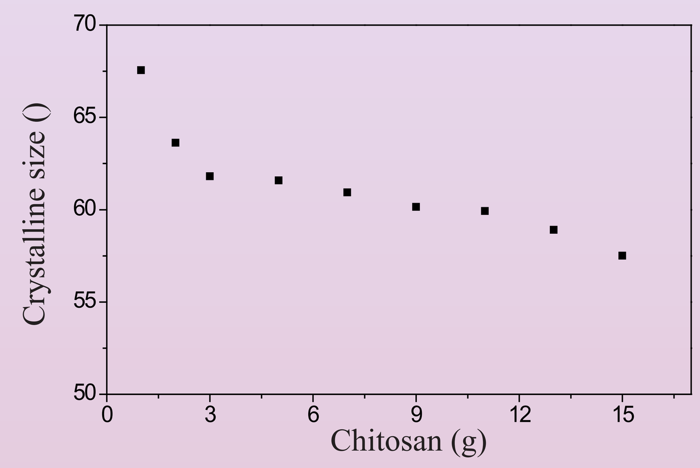


Figure 4. The crystalline size of hydroxyapatite mixed various chitosan concentration.

Conclusion

The Cs/HAp composites were synthesized from chicken egg shells and chitosan from waste shrimp shells by precipitation technique. The crystal structure and crystalline size of the Cs/HAp composites were decreased while increased concentration of chitosan. Dispersion of hydroxyapatite particles was independence on the concentration of chitosan. This experiment could be doped chitosan into hydroxyapatite and improved the performance of hydroxyapatite for medical materials.

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