Microstructural and Physicochemical Analysis of Collagens from the Skin of Lizardfish (Saurida tumbil Bloch, 1795) Extracted with Different Organic Acids

ABSTRACT

Marine fish collagen has attracted considerable attention due to its characteristics, including its biodegradability, biocompatibility, and weak antigenicity, and is considered a safer material compared to collagen from terrestrial animals. The aim of this study was to extract and characterize collagen from the skin of lizardfish (Saurida tumbil Bloch, 1795) with three different acids. The yields of acetic acid-extracted collagen (AESkC), lactic acid-extracted collagen (LESkC), and citric acid extracted collagen (CESkC) were 11.73 ± 1.14%, 11.63 ± 1.10%, and 11.39 ± 1.05% (based on wet weight), respectively. All extracted collagens were categorized as type I collagen with mainly alpha chains (α1 and α2) detected and γ and β chains to some extent. Fourier transform infrared (FTIR) spectra showed an intact triple-helical structure in the AESkC, LESkC, and CESkC. UV-vis spectra and X-ray diffraction further demonstrated the similarity of the extracted collagens to previously reported fish skin collagens. AESkC (Tmax = 40.24 ◦C) had higher thermostability compared to LESkC (Tmax = 38.72 ◦C) and CESkC (Tmax = 36.74 ◦C). All samples were highly soluble in acidic pH and low concentrations of NaCl (0–20 g/L). Under field emission scanning electron microscopy (FESEM) observation, we noted the loose, fibrous, and porous structures of the collagens. The results suggest that the lizardfish skin collagens could be a potential alternative source of collagen, especially the AESkC due to its greater thermostability characteristic.