Isolation and characterization of acid-soluble collagens from the bone and fins of the barracuda (Sphyraena spp.) as marine collagen sources

ABSTRACT

Barracuda fish (Sphyraena sp.) bone and fins could be a source of aquatic collagen. Marine collagen has recently gained popularity due to its lack of infectious infections. This collagen extraction yields 1.99 % acetic acid-soluble collagen (AAC), 2.36 % lactic acid-soluble collagen (LAC), and 3.26 % citric acid-soluble collagen (CAC). AAC has a high L* value compared to LAC and CAC, indicating great brightness in color. For hydroxyproline content, the amount of collagen was 82.70, 81.31, and 80.93 for AAC, LAC, and CAC. AAC and LAC have maximum collagen solubility at pH 3, and CAC at pH 5. The effects of collagen solubility on NaCl concentrations drop substantially at 30 g/L for all collagen samples. All extracted collagen structures are type I collagen consisting of two chains (α1 and α2) based on SDS-PAGE analysis and possessing a complete triple helical structure based on UV absorption (229.5 nm) and Fourier Transformation Infrared Spectrometry (ATR-FTIR) showed all collagen samples had amide A, B, amide I, II, and III peaks. All collagens demonstrate strong heat resistance and structural stability as Tmax is above 30°C. LAC demonstrated higher absorption of water (0.50 0.01±mL/mg) and oil (0.70±0.07 mL/mg) than AAC and CAC. At pH 7, CAC and AAC reduced foam and foam case capacity. In emulsion properties, only AAC does not demonstrate important emulsion stability. AAC showed superior collagen than LAC and CAC based on physicochemical and functional qualities. Therefore, all collagen samples can be employed as replacements for terrestrial collagen in diverse applications.