

Extraction of Collagen from Fresh Water *Pygocentrus Brachypomus* (Red-bellied Piranha) and Its Physical, Biochemical and Morphological Characterization

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Abstract

Collagen is the most common structural protein constituting the skin and many other tissues in humans. The market for collagen extends from cosmetics to therapeutics and is estimated to be \$ 6.63 billion by 2025. Owing to the increased demand and unbound religious restrictions, corollary parts of fish are extensively sought for as the source of collagen. *Pygocentrus brachypomus* (Red-bellied Piranha) is one of the largely consumed fish varieties in South India and the extraction of collagen from its scales is reported for the first time through this study. The yield of the Acid Soluble Collagen (ASC) extracted based on dry weight was $0.5 \pm 0.08\%$. The Ultraviolet absorption spectrum exhibited the maximum absorption at 230 nm. The peaks from the Infrared spectrum, X-Ray Diffraction analysis confirmed that the extracted collagen retained the triple helical native conformation. The results of Differential

Scanning Calorimetry revealed that the thermal stability of the extracted collagen was higher with $T_d - 38.94\text{ }^\circ\text{C}$ and $T_m - 92.5\text{ }^\circ\text{C}$ and was comparable to bovine and porcine sources. The average particle size of the extracted collagen was calculated to be 517.2 nm. Electron micrograph of the extracted collagen presented loose, parallel oriented long fibres with interconnected fibrils. Hence, the collagen extracted and characterized is a safe alternative for various biomedical applications.

Keywords: *Pygocentrus brachypomus*, Acid Soluble Collagen, thermal properties, native conformation, interconnected fibrils