

## **Biochemical and Characteristics of Acid-Soluble Collagen from Food Processing By-Products of Skin Needlefish (*Tylosurus acus melanotus*)**

### **ABSTRACT**

By-products include as skin, fins, bones, scales, and viscera contribute for around 40% of total catch weight of fish. Three different forms of acid-soluble collagen were successfully isolated from needlefish skin (*Tylosurus acus melanotus*). Organic acids has been used to dissolve non-cross-linked collagen and disrupt some cross-links to increase collagen solubility during extraction. Based on dry weight, the resulting content of acid-soluble collagen extracted using acetic acid (AAC), lactic acid (LAC), and citric acid (CAC) treatments was 3.13 % with significantly different ( $p < 0.05$ ), followed by 0.56 % and 1.03 %, respectively. All collagen sample was analyzed for physicochemical, and functional qualities. Characterization of collagen structure using Sodium Dodecyl Sulphate Polyacrylamide Gel (SDS-PAGE) analysis showed that all extracted collagen is type 1 collagen with two  $\alpha$  chains ( $\alpha_1$  and  $\alpha_2$ ). UV absorption and Fourier Transform Infrared Spectroscopy revealed that all three collagens had a complete triple helical structure (ATR-FTIR). AAC significantly outperforms LAC and CAC in terms of yield following physicochemical characterisation that included determining pH, colour (L\*value), and hydroxyproline content. All collagens were tested for solubility using the effect of collagen on varied pH and NaCl levels. Collagen was most soluble at pH 5 for AAC, pH 3 for LAC, and pH 7 for AAC. The effect of collagen solubility on NaCl concentration was discovered to be a significant reduction in graph to 50g/L for all collagens samples. All collagen can be used as alternatives for terrestrial collagen in a variety of applications, including food, pharmaceuticals, and cosmetics.