Shark cartilage (*Prionace glauca*) by-products as collagen source for biotechnological applications

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INTRODUCTION AND OBJECTIVES

Blue shark (*Prionace glauca*) is one of the most widespread species in the epipelagic zone. Its geographical distribution is within the fishing areas of tuna and swordfish, so it has always been an incidental catch in those fisheries. Their fins and meat are consumed as food, skin is used for leather, liver for oil and by-products generated during processing, are normally used in the fish meal industry (FAO)\(^1\). Trunk cartilage, by-product generated at fish processors, might be a source of collagen and so, its valorisation is worth to be explored. The aim of this study was to investigate the collagen content and characteristics of the cartilage from blue shark as potential alternative of mammals collagen.

EXPERIMENTAL WORK

The isolation of marine collagen is generally carried out in three steps: pre-treatment (P), extraction (E) and recovery (R) (Fig1) with slight modifications depending on the raw material used\(^2\). Shark trunks structure are depicted in Fig 2. It was washed with distilled water and was subdivided in two parts: proper cartilage (blue part, C) and disc or centrum (yellowish part, D). Both parts were homogenized by a mixer and stored at -4ºC until used.

RESULTS AND DISCUSSION

ASC and PSC yields showed that collagen can be isolated from cartilage of blue shark, both from the cartilage part (C) and the disc (D). Higher yield was obtained for PSC from C in comparison with PSC from D (Fig 3). Both parts were characterized by proximate analysis and the collagens obtained were characterized by amino acid contents (Fig 4). ASC and PSC from both parts showed similar amino acid composition, except for Lys and Hlys. SDS-polyacrylamide gel electrophoresis (SDS-PAGE) (Fig 5) and Fourier transform infrared (FTIR) spectroscopy (Fig 6) indicated similar secondary structures and that they could contain type I and type II collagens.

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REFERENCES


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Due to these characteristics, both collagens could be used as alternative to mammals collagen in different applications.