

MICROBIOTEC 19

December 5th-7th, 2019
University of Coimbra (Pólo II)

CONGRESS OF MICROBIOLOGY
AND BIOTECHNOLOGY 2019

BOOK OF ABSTRACTS



III6. Health Microbiology and Biotechnology

FP211. Cod skin collagen extraction and characterization

Ezequiel Coscueta, María Brassesco, Manuela Pintado

CBQF – Centre for Biotechnology and Fine Chemistry, Universidade Católica Portuguesa, Porto, Portugal

E-mail: mbrassesco@porto.ucp.pt

Collagen is a structural protein present in different animal tissues and has a wide range of applications in the health-related sectors. Regarding its industrial exploitation, collagen has mainly bovine and porcine origins. However, due to religious beliefs and infectious diseases, other collagen sources are being debated. In this regard, the use of collagen with marine origin is being considered highly attractive by the industry as an important alternative source. Fish residues may account for an average of 55% of the total fish weight; of this material, up to 30% may be skin and bone. Fish skin has more than 80% of its total protein content as collagen. Thus, a general methodology to isolate collagen from fish by-products was applied for cod skin collagen recovery: a sodium hydroxide (NaOH) pre-treatment to remove non-collagenous proteins, pigments or fats, followed by the extraction phase using an acid solution to obtain the Acid Soluble Collagen (ASC). Finally, collagen was precipitated adding NaCl and collected by centrifugation, dissolved in acetic acid and dialyzed. The ASC extracted from cod skin was then partly characterized. SDS-PAGE analysis showed the characteristic bands which represents the typical structure of type I collagen, including two different kinds of α chains, β chains (dimers) and γ chains (trimers). The UV absorption data of ASC from cod skin was a maximum absorption at 213 nm, confirming the typical absorptions near 210–240 nm of collagen. No absorbance measurements were obtained at 280 nm due to low concentrations of aromatic amino acids in ASC. FTIR analysis presented the main collagen characteristic absorption peaks contained amide A, amide B, amide I, amide II, and amide III. The amide III band (1238 cm^{-1}) revealed the presence of a helical structure and the ratio of absorbance between amide III and the $1400\text{--}1454\text{ cm}^{-1}$ wavelength was 1.08, which revealed that the triple helical structure of collagen was intact. The SEM images confirmed that the collagen fibrils remained intact after the extraction process. Therefore, cod skin collagen may be an alternative to terrestrial mammalian collagen and may enhance the added value of this fish species.