

## **Collagen extraction from Asian sea bass and silica purification from diatoms envisaging the development of scaffolds for bone regeneration**

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The use of marine and freshwater resources to obtain valuable compounds is an approach receiving more attention in recent years under the scope of sustainable exploitation of these resources – namely under the concept of Circular Economy - adding value to the current management of fish by-products and microalgae that is mainly associated with animal feed. This work looked particularly into Asian sea bass scales for the extraction of collagen, using acetic acid (AColl) and pepsin (PColl) based methodologies, as well as to diatoms produced in aquaculture, which were used to recover silica by thermal purification. The extraction of collagen was possible from Asian sea bass scales through the referred methods having an extraction yield of 1% and 6.6% for AColl and PColl respectively, with both extracts being characterized by SDS-PAGE profile, obtaining a profile compatible with type I collagen. Moreover, the results from FTIR-ATR and CD analyses suggest that the collagen triple helix was preserved during extraction, with a denaturation temperature around 44 °C. The viscosity of the collagen samples (0.5 %) were measured through a Digital Viscometer, which showed that the extracts are non-Newtonian fluids, having a similar viscosity of 3 mPa/s. The thermal purification of silica from diatoms was reached at 600 °C, according to the results obtained by Thermal gravimetric analysis (TGA), with FTIR-ATR and SEM/EDS analysis confirming the presence of Si in the SiO<sub>2</sub> form, and that the structure of the frustules has been destroyed. The produced materials have shown interesting results looking into their future use as building blocks for the production of biomaterials for biomedical applications. In particular, their use in scaffolding for bone regeneration is currently being addressed.