"Revalorization of *Loligo spp.* Pen to Produce Ultrapure Grade β-Chitin and β-Chitosan at the Industry Level"

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ABSTRACT:

The processing of seafood at the industry level generates vast volumes of organic discards and by-products, rich in bioactive compounds, whose valorization means direct environmental benefits and potential economic ones. So far, industrial food transformation has followed a linear economy approach; from extraction of resource to its consumption and final waste produced. However, more and more companies, aware of the importance of sustainable use of natural resources, have started applying I+D+i techniques to utilize the sub-products generated in their activities. In our case, we have focused on the valorization of squid (*Loligo spp*.) pen to produce β-chitin and β-chitosan, with enormous presence in the market - α type mainly - and great future prospects, by optimized, environmentally friendly procedures. Excellent physicochemical characterization results were obtained for both extracts; β-chitin: 6,689 +/- 0,04 C/N Ratio ("Pure" chitin - totally acetylated: 6,685); 89,98% +/- 2,17 DA; 89,21% +/- 1,26 DD, whereas β-chitosan: 5,231 +/- 0,07 ("Pure" chitosan - totally deacetylated: 5,143); 93,27% +/- 0,57 DDA - Ultrapure Degree. Their infrared spectra (FTIRS), show the characteristic bands identifying the distinctive functional groups (Amides and hydroxyl groups) of both β-chitin and β-chitosan, confirming the nature of the compounds. These biodegradable, non-toxic and biocompatible compounds, especially β-chitosan, present superb properties; antioxidant, antiseptic, anti-inflammatory and chelating ones, amongst others, as well as show synergic properties with other bioactive compounds such as collagen, glycosaminoglicans (HA, CS), hydroxiapatite and carragenate. Therefore, their applications are in the number of hundreds in many different industries. Due to the high purity and DDA in β-chitosan, we nominate it for uses in the biomedical and pharmaceutical sectors, highlighting its capacity to formulate biofilms, encapsulating structures and scaffolds for tissue engineering applications with all the beneficial properties the bioactive compound possesses.

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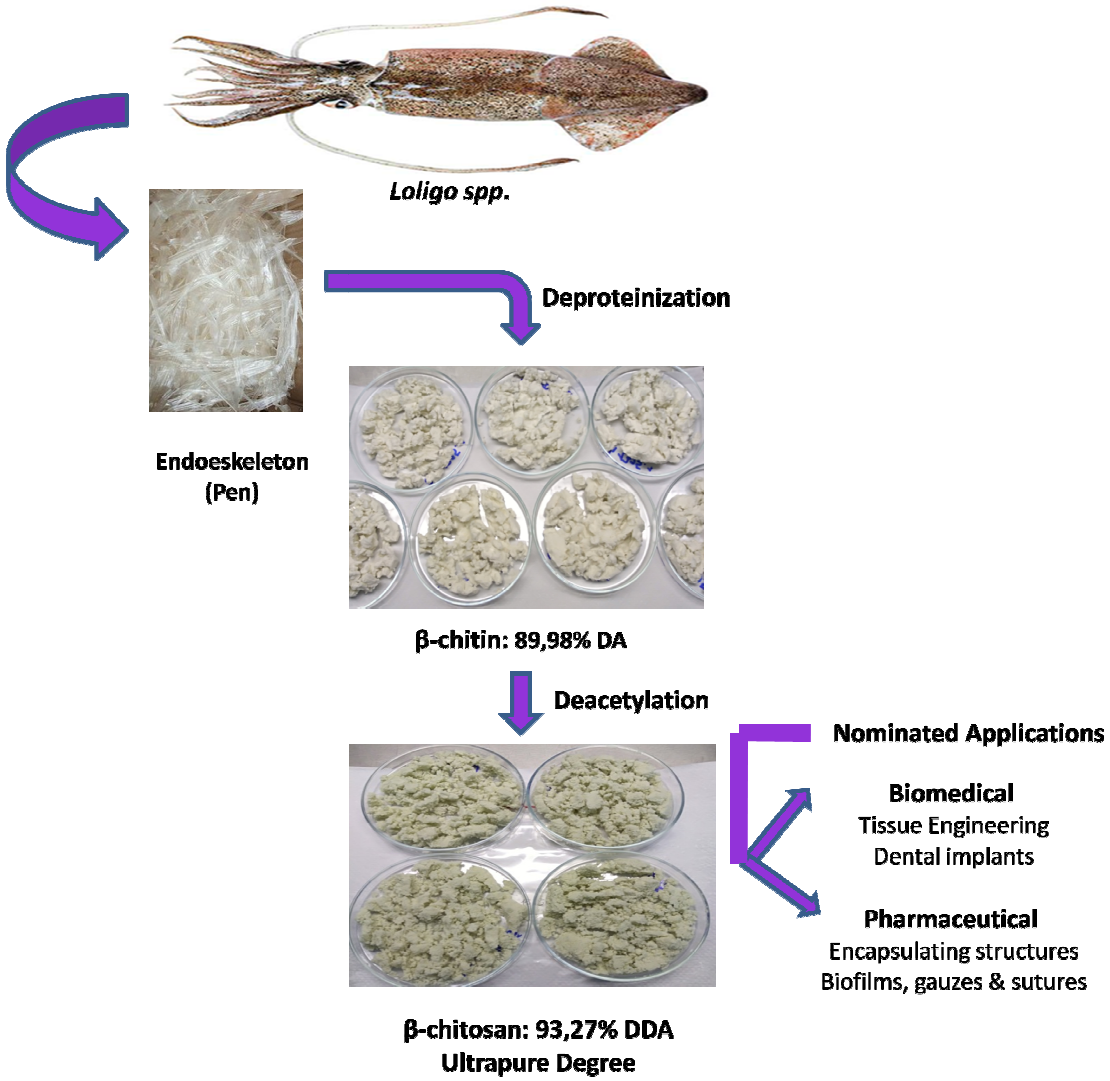


Figure 1. Diagram showing the optimized extraction of β-chitin and β-chitosan from *Loligo spp.* pen at the industry level.