Active packaging materials from fish wastes

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The global production of plastic has continuously increased. Conventional plastics play an essential role in modern society, since they can find civil and industrial applications thanks to their properties: light weight, flexibility and durability. However, the huge amount of plastic waste production is one of the most-faced issues over the world both for environmental problems and human health threat. Conventional petroleum-derived plastics represent a serious problem for global pollution because, when discarded in the environment, they remain for hundreds of years. For this reason, there is a considerable and growing interest in biodegradable materials obtained from natural polymers[1]. Chitosan, which is obtained by partial or total deacetylation of chitin, is one of the most abundant polysaccharides in nature, and a promising material for the production of packaging materials. Moreover, chitosan is non-toxic, biodegradable, and has antimicrobial activity. The FISH4FISH project* involves the production of innovative, active and sustainable packaging material based on chitinolytic derivatives, using marine biomass wastes. Chitin obtained from marine biowastes was treated to obtain colloidal chitin and its deacetylated forms, chitosan. In order to scale-up the process and to reduce the global costs, the chitooligosaccharides (COS) were obtained using the hydrolytic activity of chitinase immobilized on magnetic nanoparticles and chitosan beads[2]. Lignin nanoparticles functionalized with COS were used as active biofiller in the preparation of the new bioplastic to confer antioxidant, antimicrobial, UV-shielding and improved mechanical properties[3]. The innovative active packaging is able to tackle microbial spoilage, enhancing fish shelf life, and in the end of its life, it can be used as fertilizer and microbial preservatives for plants.

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References

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