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TITLE

Development of Drug Delivery Systems for Fish Larvae Reared in Aquaculture

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Most marine fish larvae reared in aquaculture hatch with immature digestive and immune systems, being extremely susceptible to diseases. Thus, sub-optimal rearing conditions are often associated with high larval mortalities, leading to high production losses. This work aimed to develop microencapsulated carriers of bioactive compounds to reduce disease susceptibility and increase fish larval survival. For this purpose, spray-drying and emulsification techniques were used to produce gelatin, chitosan, carrageenan and alginate microcarriers, where two model compounds were encapsulated: protein hydrolysate and a vitamins/minerals mixture, both with bioactive properties. Several techniques were used to characterise the carriers' size, morphology and release profile. In addition, the first prototypes of alginate and carrageenan produced by emulsification were tested for digestibility in Senegalese sole (*Solea senegalensis*) larvae, a species targeted for aquaculture in Southern-European countries. Results showed that spray-drying produced delivery systems of adequate size (2-8 µm) for a subsequent inclusion in fish larvae diets. Chitosan was elected a good matrix-forming material for these carriers, allowing 40-70% of model drugs to be released according to an initial controlled-release profile. This is an important feature to prevent saturation of intestinal transporters in fish larvae. Water-in-oil emulsions produced microcarriers with an adequate size for direct ingestion by fish larvae (50-250 µm). However, results also showed that alginate and carrageenan carriers were poorly digested by sole larvae, suggesting that digestibility and release profile of chitosan and gelatin microcarriers produced by emulsion should be further investigated.

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Biography

At the age of 26, Ana Grenha has concluded her PhD in Pharmaceutical Technology in 2007, at the University of Santiago de Compostela (Spain). Since 2007, she is Assistant Professor in Pharmaceutics at the University of Algarve and Group Leader at the Centre for Molecular and Structural Biomedicine in the same University. Her research is focused on bioencapsulation strategies, namely on the development of natural polymeric nanoparticles for systemic delivery of protein-based drugs through mucosal routes. A recent collaboration has directed bioencapsulation knowledge towards the field of aquaculture. Ana Grenha has published more than 25 papers/book chapters in reputed journals and is a Section Editor in an International Journal.