

# Beneficial effects of probionts in marine fish larvae and their modes of action

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The persistent use of antibiotics in aquaculture has resulted in antibiotic resistance, comprising environmental and human health risks. The use of beneficial bacteria or probionts might be an effective alternative in disease prevention and production enhancement. The use of probionts in aquaculture is popular as a numerous amount of scientific studies have reported improved survival and growth of fish larvae when supplied with probionts. However, there is a lack of knowledge on the modes of action of probionts and on their interaction with the aquatic host, which is of paramount importance to utilize the right probiotic strain to prevent specific diseases. As such, aquaculture production will be improved and the side-effects associated with the use of antibiotics reduced. The objective of this study is twofold.

First, we selected and optimized probiotic isolates. The potential probiotics were cultured from healthy larvae and adult fish. The predictive screening tools used to assess probiotic potential were: 1) the ability to adhere to and colonize the fish intestine; 2) the ability to suppress the growth of several important marine fish pathogens and 3) a lack of invasiveness or toxicity.

Secondly, we will unravel the modes of action of the probionts, selected in the first objective, with a focus on disease resistance in the host organisms, applying innovative techniques e.g. gnotobiotic larval model systems, immune priming and laser capture microdissection. Sea bass (*Dicentrarchus labrax*), the major marine fish cultured in southern Europe, was employed as a model for marine fish.