



## Beneficial Supplements for Aquaculture Promotion

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### Editorial

Aquaculture is increasing greatly as the most contributor to human welfare by helping solve the food scarcity problem and malnutrition and providing livelihood to people. and despite weakening trends, aquaculture remains the fastest growing food sector worldwide with increases in production achieved through intensification of existing farming systems. However, the nature of aquaculture itself has indirectly caused massive mortalities among the cultured organisms, particularly during larviculture. In addition, manipulations applied to the cultured animals may disturb the balance between microbial communities, or favor proliferation of opportunistic resistant bacteria or unpredictable development of bacterial communities [1]. The bacterial antibiotic resistance and antibiotic residues in cultured aquatic animals recently raised as consequence to extensive use of chemotherapeutic agents and become a global concern. Eventhough, vaccination and immunostimulant treatments are ideal methods for preventing infectious diseases they're very limited with uncommon use in aquaculture.

Through several studies of the European Centre for Disease Prevention and Control (ECDC), European Food Safety Authority (EFSA), and the European Medicines Agency (EMA) (ECDC/EFSA/EMA 2015) on AM agents (Anti-Microbial agents) revealed the important occurrence of AMR with a positive correlation between AMs in animal husbandry and AMR genes in human pathogens [2]. Moreover, a potential bridging has been demonstrated between aquatic and human pathogen resistomes that leads to emergence of new AMR bacteria and dissemination of their genes into animal and human populations [3]. In this respect, use of probiotics is

gaining acceptance in aquaculture control for potential pathogens of farmed aquatic species as fish (eggs, larvae, juveniles and adults), invertebrates (crustaceans and bivalve mollusks) and live food (unicellular algae, rotifers and artemia) and all can be improved by use of probiotics as a method for keeping the environment, preventing farmed aquatic disease, improving the control of pathogens and increasing feed efficiency, growth and husbandry parameters.

The probiotics for beneficial aquaculture belong to wide range of microorganisms groups mainly related to lactic acid bacteria group and list of potential beneficial bacteria species is increasing (Lactobacillus, Enterococcus, Carnobacterium...etc) and several yeast species [4]. The immense potential of probiotics lies on their in vitro and in vivo multiple mechanisms well documented including: production of inhibitory compounds, competition for chemicals or available energy, competition for adhesion sites, inhibition of virulence gene expression or disruption of quorum sensing, improvement of water quality, enhancement of the immune response, source of macro and/or micronutrients and enzymatic contribution to digestion.

The enormous number of probiotics papers in aquaculture highlights the multitude of advantages for their use as beneficial supplements and position them in the dynamic search for health-promoting alternatives for cultured fish and shellfish [5]. Furthermore, the complexity of microbial communities in terms of diversity and functionality is huge and current metagenomics and metaproteomics, represent important and useful provided tools, for monitoring microbial communities in

aquaculture systems using probiotics to define more precisely it's in vivo mechanisms to promote their beneficial potential.

### References

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