

4. Dietary Effect of β -Glucans on Nile Tilapia Microbiome and Health

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Successful fish rearing during the early stages is essential to ensure production of high-quality juveniles. However, there are still bottlenecks in the larval-rearing processes due to the vulnerability of these stages. Lack of a mature immune system and low-stress tolerance are the foremost reasons for poor larvae performance. The use of antibiotics, as commonly applied in the past to address this issue, should be restricted to avoid the development of antibiotic-resistant genes. Therefore, one of the alternatives to improve fish health is enhancing the overall health and mucosal barrier functioning by using, e.g., prebiotics through the feed. Incorporating β -glucans, a widely used prebiotic, in fish diets has shown positive effects in steering the gut microbiome and modulating the immune system. However, the knowledge is mainly derived from juvenile fish, and impacts in the larval stages are still obscure. Thus, this study aims to explore to what extent early-life feeding with β -glucans influences the composition of the gut microbiota and the overall gut health of Nile tilapia (*Oreochromis niloticus*), starting from first feeding till juvenile stages. We will test two types of β -glucans at two different dosages: a non-soluble and a soluble β -1,3/1,6-glucan, to evaluate their mode of action and optimal levels for young fish. At the end of the feeding period (nine weeks), the gut microbiota development, the regulation of gut health-related genes, gut histology, digestive enzyme activity, and microbial communities' metabolism will be assessed to understand the effects of β -glucan supplementation effects on gut barrier functioning and microbiota functionality.