

Mechanistic Insights Into The Change Behavior; Its Relationship With Water Velocity, Nanoparticles, Gut Bacterial Composition, And Its Functional Metabolites

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Abstract : The widespread use of nanoparticles means that they are significantly increasing in the aquatic ecosystem, where they are likely to pose threat to aquatic organism. In particular, the influence of nanoparticles exposure combined with varying water velocities on fish behavior remain poorly understood. Emerging evidences suggested a probable correlation between fish swimming behavior and gut bacterial dysbiosis. Therefore, the current study aimed to investigate the effects of nanomaterials in different water velocities on fish gut bacterial composition, which in results change in fish swimming behavior. The obtained findings showed that the contamination of nanoparticles was reduced as the velocity increased. However, the synergetic effects of nanoparticles and water velocity significantly ($p < 0.05$) decreased the bacterial composition, which plays a critical role in fish development, metabolism, digestion, enzymes production, and energy production such as Bacteroidetes and Firmicutes. This group of bacterial also support fish in swimming behavior by providing them a significant energy during movement. The obtained findings of this study suggested that the presence of nanoparticles in different water velocities have had a significant correlation with fish gut bacterial dysbiosis, as results the gut dysbiosis had been linked to the change in fish behavior. The study provides an important insight into the mechanisms by which the nanoparticles possibly affect the fish behavior.

Keywords : water velocities, fish behavior, gut bacteria, secondary metabolites, regulation

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