9. Basic Research on Bacteria Contributing to the Disposal of Ammonia Generated by Residual Feed

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The closed-circulation land-based aquaculture of marine products requires the disposal of harmful ammonia from the rearing water. However, despite the widespread use of biological wastewater treatment, little specific analysis has been performed on the behavior and community structure of the microorganisms relied on for this treatment.

This study investigated the bacterial flora that help reduce the concentration of ammonia nitrogen generated by residual food. The method involved nanobubble devices in the experimental environment to supply oxygen to the aquarium, creating a state in which fine bubbles are constantly present in the water. We extracted bacterial DNA from the filtration residue in the aquarium water and performed DNA sequencing using next-generation sequencers to identify the dominant bacterial species. The results suggest that most of the ammonia nitrogen is consumed by aerobic bacteria for assimilation to synthesize amino acids. We also identified isolates that can be expected to be suitable based on the characteristics of Bacillus sp. and yeast strains cultured from the aquarium water.

Key words: Closed-circulation land-based aquaculture, ammonia nitrogen, nanobubble device, assimilation, aerobic bacteria