

Advances in wastewater recycling technology of marine recirculating aquaculture systems (RAS)

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Abstracts: Since the 1960s, China's mariculture has roughly experienced five main stages including algae culture, shrimp culture, shell fish culture, fish culture, and sea cucumber culture. Recirculating aquaculture systems (RAS) for mariculture have been used due to their advantages such as high culture density, and water, land, and energy saving. Since the middle of 1990s, the wastewater recycling technology of marine RAS in China has experienced four important development stages. At each stage, some problems that limited the development of RAS were solved. During 9th Five-Year Period (1996~2000), the key techniques of rapid filtration, sterilization and oxygenation were solved, and some wastewater equipments such as microstrainer, rapid sand filter tank and high efficiency oxygen tank were researched and developed. During the 10th Five-Year Period (2001~2005), some other key equipments including protein skimmer, biofilter and UV disinfectant were created. At the third stage (2006~2010), the focus of research were on the integration and optimization of RAS, and industrial, efficient RAS were built. At the fourth stage (2011 till now), modern engineering techniques and biological technology were applied in RAS. Its research objects were to be standardization, energy saving and ecological. Also, some achievements in RAS by our institute (YSFRI) were reviewed such as some studies and applications on filtration, sterilization and disinfection, degassing facilities and equipments temperature-control facilities and equipments, online water quality auto-monitoring system, biological treatment systems, and the integration and optimization of RAS. Finally, some problems in RAS were mentioned and some challenges were prospected.