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Role of In-situ Nitrification in Design of Recirculating Systems. Riazul I. Mia, Douglas G. Drennan II, Ronald F. Malone*. Department of Civil and Environmental Engineering, Louisiana State University, Baton Rouge, LA 70803-6405, USA.

While conducting research on the optimization of bead filters for nitrification and solids capture in recirculating systems, the researchers became aware of the fact that not all of the nitrification was occurring within the biofilter. In fact, mass balance revealed that at times over 50% of the nitrification was occurring in-situ (outside of the biofilter). The researchers theorize that the in-situ nitrification must be occurring 1) within the water column, 2) on the tank walls, and 3) on the inside of the PVC piping system taking water to and from the biofilter. Data collected from three different tilapia systems (n=21) showed in-situ nitrification rates ranged from 30% to 60%.

Research was then undertaken to better understand and categorize the in-situ nitrification. All water quality tests were conducted using Standard Methods (1989). In-situ nitrification within the water column was estimated by measuring the drop in TAN and NO_2-N in a sample of aerated system water over a 1_2 hour period. In-situ nitrification occurring on the tank walls was measured by placing a fiberglass plate within the system for 30 days, them placing it in a sterilized sample of aerated system water and measuring the drop in TAN and NO_2-N over a 12 hour period. Finally, insitu nitrification was estimated in the pipes by pumping system water through 50 ft of 5/8" i.d. pipe and again measuring the TAN and NO_2-N drop.