Designing a Cost Effective Aquaponics System for Small Urban Households

Pereira, Juliana

I have developed a cost effective aquaponic system that can be sustained in an average urban household. My initial goal was to develop an inexpensive system that urban families could use to increase their accessibility to healthy food choices. I was motivated to undertake this design project because studies, as well as my own personal experiences, show that families who live in urban neighborhoods tend to not receive the recommended level of daily nutrition needs. The solution I found to reach this goal was through aquaponics. I built two prototype systems out of easily available parts: one based on the nutrient film technique (NFT), and the second based on deep water culture (DWC) rafts. To facilitate a direct comparison, I also modified two “inexpensive” commercial systems provided by my school to grow plants either by NFT or DWC. All four systems were quite successful at growing the crops I chose for my pilot study: basil, butter crunch lettuce, and romaine lettuce. However, my two prototypes had a capital cost only 65% of the commercial systems, but area for growing nearly twice the number of plants. Together with the plants that I had chosen to grow, my prototype systems were more than 3 times more cost effective than the commercial systems, and the capital costs were nearly covered by produce “income” after the first six month period.

Awards Won: