



**The College of Graduate Studies and the College of Agriculture and Veterinary Medicine
Cordially Invite You to a
Master Thesis Defense**

Entitled

*STANDARDIZING SUSTAINABLE AQUAPONIC PRODUCTION OF LEAFY GREENS AND FISH: A
COMPARISON WITH CONVENTIONAL SYSTEMS IN THE UNITED ARAB EMIRATES*

By

Drishya Nishanth

Faculty Advisor

Dr. Abdul Jaleel, Integrative Agriculture Department
College of Agriculture and Veterinary Medicine

Data & Venue

12 June 2023

Building F3, Room # 021

12 pm – 2 pm

Abstract

The production of leafy greens vegetables through aquaponics is established worldwide, but the production of herbs which are used in day-to-day life in the United Arab Emirates is not yet explored in this system in terms of production efficiency, water usage and the nutrient parameters. In the current study, basil (*Ocimum basilicum* L.) and coriander (*Coriandrum sativum* L.), the two commonly used herbs, were grown in a traditional aquaponics system using Tilapia fish and Catfish effluent water (soilless agriculture) and an irrigation-based greenhouse cultivation system (soil cultivation). The study's major goal is to evaluate several growth techniques for these herbs and choose the most effective one. The growth metrics of the plants, the nutrient makeup of the plants and the aquaponics water, and the antioxidant levels of the herbs were all examined at the end of the experiment. In terms of morphometric data, the aquaponics method for growing basil and coriander was clearly superior compared to the soil-based approach. The findings indicate that in a soil-less (aquaponic) system, the growth parameters for both herbs, including plant height, root length, number of leaves, and fresh and dry weights, were significantly higher when compared to conventional soil system. The substantial improvement may have been the way the plants used the nutrients in the aquaponics fish effluent water. The fish performance also showed significant enhancement under aquaponic set up, in terms of growth and survival rate. This study helps to provide convincing proof that a sustainable aquaponics system is superior to other conventional methods of food production. The study also found that plants from both systems had significantly higher levels of nutrients, although the antioxidant activity in both herbs was higher in the aquaponic system. Additionally, the water use efficiency of the aquaponics system was much higher than the conventional system, with water savings of over 90%. These results provide definitive evidence and standardization to support the efficiency of sustainable aquaponics systems over other conventional food production methods, particularly in desert countries like the United Arab Emirates. The use of an aquaponic system for these commonly cultivated herbs showed improved growth and resource efficiency, thus establishing its viability as a sustainable and efficient method of food production in arid regions.

Keywords: *Ocimum basilicum*, *Coriandrum sativum*, aquaponics, greenhouse, Tilapia, antioxidants, Catfish