

Investigate The Suitability of Gold Fish (*Carassius auratus*) Effluent as a Nutrient Source in Recirculating Aquaponic Systems

A. Ahalya¹, A. Nanthakumaran^{1*}

¹Department of BioScience, Vavuniya Campus of the University of Jaffna

Aquaponics is a bio-integrated system of aquaculture where wastes produced by farmed fish are utilized for plant growth. The research aimed to probe the suitability of gold fish effluent to be used as a source of hydroponic nutrient for the growth of *Ipomea aquatica* (water spinach) plants. Circular aquariums of about 0.2 cubic meters and 1.05 square meters area with 20 liters of water in each were established and gold fish (*Carassius auratus*) were introduced at a rate of 6 /aquarium as an aquaculture system. *Ipomea aquatica* were used as a hydroponic system, planted at a rate of 25 plants per plot kept above the aquariums to form aquaponic system. Two aquaponic replicates were made along with a control set up that lack hydroponic system. Water quality parameters of the effluent and vegetative parameters of water spinach were measured on a weekly basis for eight weeks from November to December, 2016. Water quality parameters (TS, TSS, TDS, pH, EC, DO) of effluent utilized by the hydroponic plants were analyzed statistically using paired t-test over the control set up. Correlation between the mean vegetative growth (plant height, stem circumference) and water quality parameters were analyzed with Pearson's correlation, simple linear regression and ANOVA using Minitab 17 statistical package. Pearson's correlation between TS and height ($r=0.946$, $p=0.000$), TS and circumference ($r=0.935$, $p=0.001$) showed a strong positive correlation between the variables. Significant positive linear correlation was observed between TS and plant height ($r=+0.895$), TDS and height ($r=+0.834$) as well as TSS and height ($r=+0.884$). Similarly, significant positive linear correlation was observed between TS -circumference ($r=+0.874$), TDS -circumference ($r=+0.833$) and between TSS — circumference ($+0.834$). Significant difference in treatment and control was observed in EC ($p=0.000$), TS ($p=0.001$), and DO ($p=0.000$) but not in pH ($p=0.339$). As a result, this analysis revealed that the nutrients were absorbed by the plant from the effluent efficiently. This suggested that the gold fish effluent could be used as a source of hydroponic nutrient solution.

Keywords: Aquaponics, Hydroponics, Gold fish, Effluent