

## AquaFish Innovation Lab Project - Investigation 4

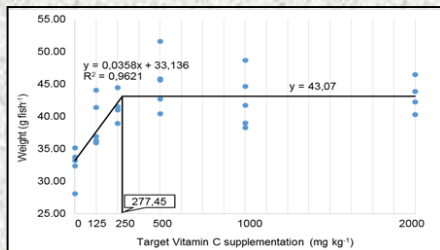
Pellet feed improvements through vitamin C (Ascorbic acid, AA) supplementation for snakehead culture

### Objective

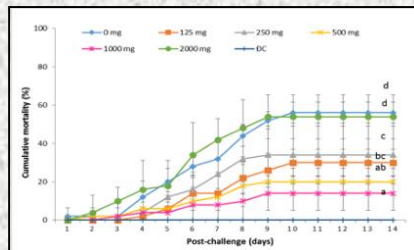
**To improve pellet feeds** for snakehead aquaculture in Vietnam and Cambodia by determining **optimal AA requirement** in **practical diets** in **laboratory** and **pond trials**.

### Laboratory feeding trial

Survival was significantly higher at 250 and 500 mg.kg<sup>-1</sup> than in the control (0 mg.kg<sup>-1</sup>). Final weight of fish in the 500 mg.kg<sup>-1</sup> treatments was significantly greater than that in the 125 mg.kg<sup>-1</sup> treatment, which in turn was significantly greater than that in the control, but there were no differences among the 250, 500, 1000 and 2000 mg.kg<sup>-1</sup> treatments. Feed Conversion Ratio (FCR) did not appear to vary in a dose-dependent manner, although some significant differences were seen. Protein Efficiency Ratios (PER) in all the treatments to which AA had been added were significantly greater than that of the control, but did not differ among themselves. Based on the weight gain data, the AA requirement for the *C. striata* was estimated to be 277 mg.kg<sup>-1</sup> (Fig. 1). Lysozyme levels in the 500-1000 mg.kg<sup>-1</sup> treatment were significantly higher than those in any other treatment. In a bacterial challenge experiment, mortality was lowest at 500 and 1000 mg.kg<sup>-1</sup> treatments (Fig. 2).



**Fig. 1.** Requirement of dietary vitamin C on growth responses of snakehead.



**Fig. 2.** Cumulative mortality over 14 d in snakehead.

### Farm feeding trial

During the 23-week experiment, the highest values of final weight, yield, and survival were observed in the fish fed with Soybean Meal (SBM) diet+500 mg.kg<sup>-1</sup> AA, which were significantly different from the control (SBM diets+0 mg.kg<sup>-1</sup> AA); whereas among the treatment groups of commercial diets+AA, these indices were not significantly different; The lowest value of FCR, in the SBM+750 mg.kg<sup>-1</sup> AA diet group (FCR=1.27), was significantly different from all commercial diets supplemented with AA. Lysozyme levels of the AA-supplemented treatments were higher than those of the control group (no AA supplementation) in both SBM and commercial diets, and the highest lysozyme levels (287.3 and 286.8 µg.mL<sup>-1</sup>) were found in fish fed diets containing 1000 mg.kg<sup>-1</sup> AA-supplemented SBM or commercial feed, respectively.

Diet-vitamin C (mg kg <sup>-1</sup> )	Wi (g)	Wf (g)	Yield (kg/hapa-4m <sup>2</sup> )	SR (%)	FCR	Lysozyme (µg.mL <sup>-1</sup> )
SBM-0	9.00	461.7	190.6	69.1	1.40	232.9
SBM-500	9.00	573.5	293.3	85.3	1.16	271.9
SBM-750	9.00	556.2	268.3	80.4	1.27	283.7
SBM-1000	9.00	565.4	264.6	78.3	1.35	287.3
CF-0	9.00	398.9	172.1	71.9	1.50	228.6
CF-500	9.00	399.8	185.9	77.7	1.47	224.1
CF-750	9.00	398.0	177.7	74.6	1.49	227.9
CF-1000	9.00	376.0	173.3	76.8	1.48	286.8

**Conclusion:** supplementation with AA at 500 to 1000 mg.kg<sup>-1</sup> of feed is appropriate for improving growth performance and immunity of snakehead on fish farms.

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