

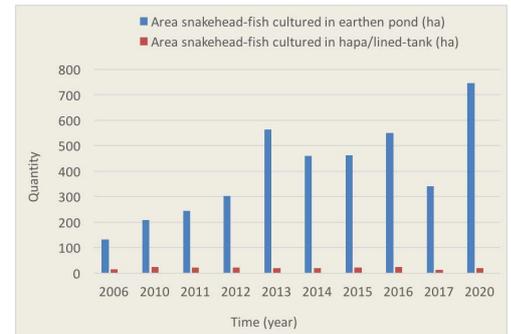
TECHNICAL NEWS

ENHANCING HEALTH OF SNAKEHEAD FISH (*Channa striata*) BY SUPPLEMENTING SUITABLE LEVEL OF VITAMIN C IN FEED

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1. Snakehead fish farming in the Mekong Delta

Snakehead (*Channa striata*) is popularly cultured in the Mekong Delta because of its delicious meat quality and reasonable price. Snakehead are produced intensively in earthen ponds, hapas in ponds and lined tanks. From 2006 to 2016, snakehead farming area increased sharply from 132 hectares to 553 hectares and production increased from 16,000 tons to 86,000 tons. The production of commercial feed for snakehead fish rose from 22,000 tons to 120,000 tons. However, snakehead farming has some problems such as diseases due to parasites, fungi and bacteria (Pham Minh Duc *et al.*, 2012), as well as slow growth and vertebral anomalies. Farming snakehead safely and sustainably by using supplements like vitamin C helps to improve health by boosting the immune system and reducing the use of antibiotics.



2. The role of vitamin C in feed for aquatic animal

Vitamin C, known as ascorbic acid, is an essential water-soluble vitamin. Vitamin C is mainly absorbed from feed. It plays an important role in metabolism, participates in the growth and development of collagen formation, enhances immune response and disease resistance, and reduces stress of fish with environmental changes.

3. Results of vitamin C supplementation on snakehead fish.

Experiment on composite tanks: The aim of the study was to determine the suitable level of vitamin C (L-ascorbate-2-monophosphate, stable with water and high temperature) for growth, feed efficiency and immune responses of snakehead. The experiment included six treatments with 0, 125, 250, 500, 1000, 2000 mg vitamin C/kg feed. After 8 weeks, growth performance and feed efficiency of snakehead were better, feed conversion ratio (FCR) reduced in treatments with vitamin C supplementation. The number of white blood cells in fish with supplemented vitamin C treatments was more than 2-3 times that in the treatment without vitamin C supplementation. The result showed that the suitable level of vitamin C in feed for growth of snakehead was 277 mg/kg feed.

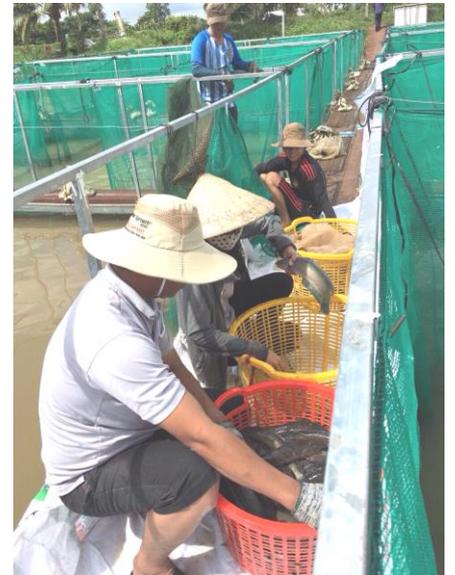
The feeding trial was followed by a bacterial challenge to determine resistance to hemorrhagic disease caused by *Aeromonas hydrophila* bacteria, which is common in snakehead commercial farming. Snakehead from the growth experiment continued into the bacterial challenge as six treatments which were injected with 0.1 mL *A. hydrophila* bacteria (3.4×10^5 CFU/inds) and a negative control treatment was infused with 0.1 mL of 0.85% physiological saline. After 14 days, mortality rate at 500 mg and 1000 mg treatment were

lower (34% - 40%) than the treatment without vitamin C supplementation. Especially, lysozyme activity was increased in all treatments with vitamin C supplementation. This research has demonstrated that vitamin C promoted growth, increased feed efficiency and increased immune response, helping to improve the resistance to *A. hydrophila* and normal development. However, growth and immunity did not improve when supplemented at 2000 mg/kg feed.



Trial in hapas: The aim of this study was to determine the appropriate level of vitamin C in commercial feed to improve growth and immune system of snakehead at commercial grow-out scale.

Formulated feed was supplemented directly during processing with vitamin C at 0, 500, 750, 1000 mg/kg feed. Initial snakehead fingerlings were 9 g each and the stocking density was 150 fish/m² (4 m² hapa). The 5-month experiment had four replicates per treatment. The weight of snakehead fish in treatments with vitamin C supplementation was higher (550-570 g/fish) than the treatment without vitamin C supplementation (460 g/fish); survival rate in treatments with vitamin C supplementation was higher (78-85%) than in the control treatment (69%); FCR in supplemented vitamin C treatments was lower (1.20-1.35) than in the control treatment (1.40). Nevertheless, rate of vertebral anomalies was not significantly different between supplemented vitamin C treatments and the control treatment. Lysozyme activity in supplemented vitamin C treatments was higher than in the control treatment. These results demonstrate that vitamin C helps to improve growth and health of snakehead fish at commercial when supplemented at 500 mg/kg feed.



When commercial feed was supplemented with vitamin C by hand-mixing at levels of 0, 500, 750, 1000 mg/kg feed, weight, survival and FCR and lysozyme activity were not significantly different. This result demonstrated that the method of mixing vitamin C into feed by hand was inefficient.



CONCLUSION: Supplementing vitamin C at level 500 mg/kg feed during commercial feed production process for snakehead fish helps to improve health and promote growth.

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