

Evaluation of Dietary Essentiality of Ten Vitamins for Juvenile Black Rockfish (*Sebastes schlegeli*)

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Introduction

Juvenile black rockfish, *Sebastes schlegeli* is an important commercial species along the coast of Republic of Korea. The black rockfish possesses some desirable characteristics for aquaculture including tolerance to cold water and handling, and receptivity to induced spawning in captivity. However, several constraints currently exist which limit the efficient production of black rockfish in aquaculture. One such constraint is the lack of nutritionally complete and cost effective diets. Studies of the requirements for various vitamins and deficiency symptoms of freshwater fish including salmonids and channel catfish have been carried out by many researchers. In marine fish, however, limited studies have been reported (NRC, 1993). However, few studies of the vitamin requirements of black rockfish have been reported. Therefore, the present study was designed to determine the dietary essentiality of commonly required expensive vitamins like biotin, choline, inositol, Vitamin E, Vitamin B₂, Vitamin B₆, Vitamin K₃, benzoic acid, folic acid and pantothenic acid in juvenile black rockfish.

Materials and Methods

Effects of the deletion of individual ten vitamins (biotin, choline, inositol, Vitamin E, Vitamin B₂, Vitamin B₆, Vitamin K₃, benzoic acid, folic acid and pantothenic acid) from semi-purified diets on juvenile black rockfish growth and survival were examined in a 8- and 11-week feeding trial. Twelve diet including all ten vitamins deleted and supplemented diets were fed to black rockfish initially weighing 10.1 ± 0.3 g/fish (mean \pm SD) as triplicate groups of 35 fish in 100 l flow-through FRP aquaria receiving filtered seawater at a rate of 3-5 l/min system. Fish were fed to satiation twice per day. Supplemental aeration was provided to maintain dissolved oxygen near saturation by a low-pressure blower. Water temperature was from 18.1 to 25.0°C during

experimental period. Each group of fish was collectively weighed. Upon termination of the 11-week growth trial, Weight gain, feed efficiency, survival, the muscle, liver, intraperitoneal fat and intestine were measured. Muscle and whole-body of fish evaluated for proximate composition. Comparison of treatment means was made by Duncan's multiple range test with the significant level at $P < 0.05$.

Results and Discussion

The best growth and feed efficiency was observed on black rockfish fed the biotin-deleted diet; a control diet supplemented with ten vitamins mentioned above and vitamin A, B₁, B₁₂, C, D, and niacin produced similar growth and FE to fish fed the biotin-deleted diet. Significantly lower growth occurred in fish fed diets deleted in Vitamin B₂, K₃, benzoic acid, folic acid, pantothenic acid and all ten vitamins deleted diet. However, black rockfish growth were not affected by feeding the vitamin B₆, E, biotin, choline, inositol-deleted diets. Black rockfish fed a diet without all the ten vitamins had significantly the lowest WG, FE and survival. Survival of black rockfish fed diets deleted in vitamin B₆ and pantothenic acid had lower than that of fish fed the vitamin K₃, benzoic acid, folic acid and inositol. Upon termination of the 11-week growth trial, some differences in tissue indices and body composition of black rockfish including muscle ration, hepatosomatic index, intraperitoneal fat, intestinosomatic index, muscle protein and ash, as well as whole-body protein and lipid were induced by the various diets. Results from this study suggest that vitamin B₂, K₃, benzoic acid, folic acid and pantothenic acid are essential nutrient in black rockfish diets containing fishmeal and casein as a protein source. On the other hand, biotin supplementation is not necessary in black rockfish diet.

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