Dietary ascorbic acid requirement for the optimum growth performances and normal skeletal development in juvenile hybrid grouper, Epinephelus fuscoguttatus × Epinephelus lanceolatus

ABSTRACT

A 10-week feeding trial was conducted to determine the dietary ascorbic acid required by the juvenile hybrid grouper, Epinephelus fuscoguttatus × Epinephelus lanceolatus for its optimum growth, survival, and normal skeletal development. Eight experimental diets containing graded levels of ascorbic acid (4.8, 11.2, 24.1, 47.2, 75.6, 95.4, 156.2, and 303.0 mg/kg) were prepared and labeled as C5, C11, C24, C47, C76, C95, C156 and C303, respectively. Each diet was fed to triplicate groups of fish [initial weight 7.71 ± 0.06 g (mean ± SD)]. The fish were cultured in 150 L of fiber glass tank supplied with aeration and flow-through seawater system (3 L min^{-1}) with the stocking density of 15 individual per tank. During the feeding trial, fish were hand-fed with the experimental diets to apparent satiation twice a day (8:00 and 15:00). Bulk weight of each fish group was measured at 2 weeks interval. At the end of the experiment, fish were sacrificed and subjected to radiographic imaging to detect the presence of skeletal deformities. The body weight gain (BWG) of fish was in the range from 628.51 ± 39.61 to 880.18 ± 113.30%. Fish fed with the C156 diet gained the highest BWG and specific growth rate (SGR). In the present study, ascorbic acid level did not affect the survival of the hybrid grouper. The feed conversion ratio (FCR) value in all dietary treatments appeared to be less than 1, indicating hybrid grouper have high efficiency of converting feed into body mass. Multiple types of skeletal deformities (fusion, kyphosis, lordosis, and scoliosis) were observed in the fish fed with the diets containing less than 95 mg/kg of ascorbic acid. In conclusion, dietary ascorbic acid levels can affect the growth performance and normal skeletal development in the hybrid grouper. Although 95 mg/kg was sufficient for normal skeletal development, 156 mg/kg of dietary ascorbic acid is recommended for feed development to maintain the optimum growth and normal skeletal development in the fish.