

Effects of selenium yeast supplementation on growth performance and flesh quality of grass carp (*Ctenopharyngodon idellus*) in diet containing black soldier fly (*Hermetia illucens*) larvae meal

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Abstract: **【Objective】** To investigate the possibility to promote the highly efficient utilization of black soldier fly larvae meal (BSFLM) as feed ingredient by means of supplementing Se in the diet. **【Method】** A 70-day feeding trial was conducted to assess the effect of selenium (Se) yeast supplementation on the growth performance and flesh quality of grass carp in diets containing BSFLM. A total of 300 grass carp (370.14±0.74 g) were randomly divided into 5 groups, with each group repeated in triplicate. Five experimental diets were formulated, including a soybean meal-based diet (25% soybean meal inclusion, diet SM), a BSFLM-based diet (16.1% BSFLM inclusion, diet BSFLM75) by replacing 75% of SM with BSFLM, and three other diets with Se yeast added to the BSFLM75 diet at 0.3, 0.6, and 0.9 mg Se/kg diet (diets Se0.3, Se0.6, and Se0.9, respectively). **【Result】** The results showed: (1) The growth and feed utilization of grass carp in the BSFLM75 group were significantly lower than those of the SM group ($P < 0.05$), but these parameters were significantly improved in the Se0.6 group, with no notable difference compared to the SM group ($P < 0.05$). (2) The crude protein contents of the muscle and whole body were not significantly affected by the Se yeast level ($P > 0.05$), but contents of them in the Se0.3 group were significantly higher than those of the SM group ($P < 0.05$). (3) The hardness, cohesiveness, springiness, gumminess, and chewiness of the muscle in the Se0.3 group were the highest among all groups. (4) Supplementation of Se yeast improved the ventral a* ($P < 0.05$), and which reached the highest in the Se0.6 group. (5) Muscle dripping loss was not affected by the Se yeast supplementation ($P > 0.05$), but which of the BSFLM75 and Se yeast groups was significantly higher than that of the SM group ($P < 0.05$). (6) The collagen protein and salt-soluble protein contents of muscle in the Se0.3 group reached the highest ($P < 0.05$). (7) Muscle fiber area, fiber diameter, and fiber density of the BSFLM75 and Se yeast groups were significantly higher than those of the SM group ($P < 0.05$), and fiber area and fiber diameter decreased gradually with the increment of the Se yeast supplementation. However, the fiber density exhibited a trend of first increasing and then decreasing and reached the highest in the Se0.3 group. (8) Supplementation of Se yeast improved muscle sarcomere length, and it reached the longest in the Se0.3 group. **【Conclusion】** In conclusion, 0.6 mg/kg Se supplementation (dietary total Se at 1.01 mg/kg diet) could significantly reverse

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the negative effects of dietary BSFLM containing 16.1% level on growth performance, and improved flesh quality. Additionally, inclusion of 16.1% BSFLM and Se yeast supplementation improved the flesh quality of grass carp, and the flesh quality was optimal when 0.3 mg/kg Se was supplemented (dietary total selenium at 0.79 mg/kg diet).