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Variation of carotenoid content and transcripts of SRB genes in the noble scallop *Chlamys nobilis* under different light

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Carotenoids are bright yellow and red fat-soluble pigments and play important physiological roles in animals. However, animals cannot synthesize carotenoids themselves, they must acquire carotenoids through diet. Therefore, carotenoids accumulating in animal tissues can be affected by environmental and physiological factors. Moreover, carotenoids accumulation in animals can be controlled by some genes such as scavenger receptor class B type (SRB). The noble scallop *Chlamys nobilis* Reeve, a warm water bivalve, has been cultivated as an economic species in southern China since 1980s. Two stain scallops of orange and brown with different carotenoids content have been selected by a genetic and breeding program since 2008 in our laboratory. Carotenoids content in scallops' muscle of the orange strain is significantly higher than that of the brown strain. In the study, 240 scallops with the same age of 17 months old including 120 orange and 120 brown were used in order to evaluate effect of light on total carotenoids content (TCC) and transcripts of *SRB-like-1* and SRB-like-4 gene in adductor and blood. Each strain scallops were all conducted randomly by three experimental treatments of full-light (24 h light), half-light (12 h light:12 h dark) and full-dark (24 h dark) for 10 days. The result showed that the light affected TCC and SRB transcripts, but it is different between orange and brown strains. For orange scallops, TCC in adductor is significantly higher in full-light than that in half-light and full-dark, whereas TCC in blood is significantly higher in full-dark than that in full-light and half-light. For brown scallops, TCC in both adductor and blood is significantly higher in full-dark than that in full-light and half-light. For transcripts of *SRB-like-1* and SRB-like-4 gene, the highest value was in blood of brown scallops under half-light, whereas the lowest value was in blood of orange scallops under full-light. Therefore, the mechanism of accumulating carotenoids in orange and brown scallops may be different.

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Molecular cloning and expression analysis of arginase-1, arginase-2 and inducible nitric oxide synthase genes of pacu fish (*Piaractus mesopotamicus*) infected with *Aeromonas dhakensis*

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In this study, we performed an expression analysis of the Arg1, Arg2 and iNOS genes in the liver, head kidney and spleen of pacu (*Piaractus mesopotamicus*) in four periods post-infection in response to the experimental infection of the bacteria *Aeromonas dhakensis*. The strain used in the study was isolated and characterized by biochemical tests and identified as strain, which belongs to the genus *Aeromonas*. Further molecular analyses of the 16S rRNA, gyrB and rpoD genes showed that this strain belongs to the species *A. dhakensis*, which had never been reported in South America. Following the infection with *A. dhakensis*, the Arg1 gene expression levels were decreased in the head kidney 24 h post-infection and the Arg2 gene expression was reduced in the liver at 12 h and 24 h post-infection and increased in the spleen at 24 h and 48 h post-infection; the gene expression of iNOS was significantly higher in the spleen at 12 h, 24 h, and 48 h post-infection. The results showed that the Arg2 and iNOS genes were the most differently regulated in response to the *A. dhakensis* infection, indicating that they are involved in the initial immune response to bacterial infections in pacu. This is the first study that characterized and assessed the expression levels of the Arg1, Arg2 and iNOS genes in pacu in response to the infection of *A. dhakensis*, providing a valuable contribution for the understanding of the immune response mechanisms against bacterial pathogens in this important South American fish species.