Mechanism study on the chilling tolerance of aquaculture : development of chilling protectant in fis

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ABSTRACT

In Taiwan, monthly temperatures normally range from 17°C to 27°C. However, temperature may decline abruptly to 10°C or lower for a few days due to occasional cold front. It always leads to economic losses in aquaculture. At low temperature, electron transport chains tend to generate reactive oxygen species (ROS) in cells. For exploring the involvement of antioxidant system on the development of chilling tolerance, Vitamin C, a scavenger of ROS, was employed to evaluate the effect on survival rate in Carassius auratus and Tilapia nilotica upon chilling. After stressed at 8°C for 3 h, Carassius auratus pretreated with 10-4 M Vitamin C for 24 h showed the highest survival rate 76± 15%, compared with 30± 10% for untreated control. Because of the poor stability of Vitamin C, we turned to look for another compound which is stable and also useful in chilling protection. Compound X was then employed as the pretreatment reagent. After stressed at 8°C for 3 h, Carassius auratus pretreated with 10-4 M Compound X for 24 h showed the highest survival rate 50± 5%, compared with 30± 10% for untreated control. Based on the results of Vitamin C and Compound X from Carassius auratus, Tilapia nilotica, an important farmed fish, was also evaluated. After stressed at 10°C for 4 h, Tilapia nilotica pretreated with 10-4 M Vitamin C and 10-4 M Compound X for 24 h showed higher survival rate of 30± 20% and 40± 0%, respectively, compared with 13± 5% for untreated control.

Keywords : Vitamin C、Complex X、Cold tolerance、Carassius、Tilapia

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