

Pattrawut Kumnoonwat 2013: Comparison of Stress Indicators in Nile Tilapia (*Oreochromis niloticus* Linn.). Master of Science (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Associate Professor Nontawith Areechon, Ph.D. 96 pages.

This study was conducted to compare 3 stress indicators including serum glucose, serum cortisol and heat shock protein 70 (HSP70) gene expression in Nile tilapia (*Oreochromis niloticus* Linn.). Tilapia, average weight of 100 g, were stress-induced by 6 hr transport simulation and experimentally infected with pathogenic bacteria, *Streptococcus agalactiae*. For the first experiment, fish were stress-induced by placing in polystyrene bag containing 5 L water holding 5, 10 and 20 fish per bag (equivalent to 100, 200 and 400 g/L) for 6 hr and released in the tank for 24 hr. Then, they were sampled at 0 (6 hr after transportation), 1, 6, 12 and 24 hr after stress induction. Serum glucose of all treatments showed similar pattern of change and appeared to be related with the degree of stress caused by different stocking densities. At 0 hr of sampling, serum glucose of all stocking densities reached peak level and then decreased to the initial level at 24 hr. Similar trend was found in cortisol level even though more fluctuations were observed. Cortisol of all groups increased right after transportation and stayed higher than initial level after 24 hr. Expression of HSP70 were highest at 6 hr in all densities and decreased to similar initial level at 24 hr. In the second experiment, tilapia were intraperitoneally injected with *S. agalactiae* at  $10^6$  and  $10^8$  CFU/ml and 0.85% NaCl injection was used for the control. Fish were sampled at 12, 24, 48, 72 and 168 hr. Similar finding was observed in which serum glucose of infected fish appeared to be related with the degree of stress caused by different bacterial concentration. At 24 and 12 hr of sampling, serum glucose of infected fish reached a peak level, respectively and decreased to the initial level at 168 hr. Serum cortisol of infected groups increased at 12 hr post-infection and fluctuated till the end of sampling period at 24 hr. Expression of HSP70 gene in infected groups were lower than control at 24, 48 and 72 hr but higher at 168 hr. The results of this study indicated that serum glucose was a reliable indicator of stress in Nile tilapia caused by transportation and bacterial infection due to the uniform change pattern of glucose in relationship with physiological condition after stress. Additionally, the serum glucose clearly showed a more positive correlation with the degree of stress when compared with the serum cortisol and HSP70 expression.

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Student's signature

Thesis Advisor's signature