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ROLE OF HEAT STRESS IN RED TILAPIA STREPTOCOCCOSIS

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Abstract

Streptococcus agalactiae is one of the causative agents associated with warm-water streptococcosis that produces massive mortality in aquaculture. The emergence of disease in tilapia farms usually occurs during high temperature seasons, which suggested higher susceptibility of tilapia to infection under this condition. Thus, the objectives of this study were to determine the pathogenesis of streptococcosis in heat-stressed tilapia using various routes of infection and the role heat stress in the development of streptococcal infection in tilapia. Red tilapias, including the control group without heat stress, were inoculated with 10⁹ CFU/mL of *S. agalactiae* via intraperitoneal, immersion and immersion cut routes of inoculations and maintained at a water temperature of 34°C for 24 hours. Samples of brain, eyes and kidneys were taken and subjected to bacterial isolation, PCR, histological examination and immunoperoxidase test. Diseased fish showed typical signs of bacterial septicaemia including skin and fin haemorrhage and exophthalmia. The fishes were more susceptible to intraperitoneal route of infection, followed by immersion cut and lastly immersion. The bacteria was isolated and detected by PCR from all organs of fishes with and without heat stress. The lesions were more clearly seen first in fishes with heat-stressed than those without. Fifty percent mortality occurred in the heat-stressed group infected via intraperitoneal route. However, no mortality was observed in the group without heat stress. Post-mortem revealed that the lesions were more severe in the heat-stressed group infected via the intraperitoneal route than those infected via the immersion cut and immersion routes. The lesions observed were haemorrhage, presence of inflammatory cells and bacteria in the brain, eyes and kidneys. There is significant ($p < 0.05$) difference between route of infection and heat stress in most of the organs. However there is no significant ($p > 0.05$) difference was observed between routes of infection in most organs of fishes without heat stress. Immunoperoxidase test were positive in most organs. However, the intensity of the antigen-antibody reactions were greatest in the group infected via the intraperitoneal route followed by immersion cut and immersion groups. In conclusion, the severity of lesions observed in the brain, eye and kidneys are most marked in heat-stressed red tilapias infected with *S. agalactiae* via the intraperitoneal route, followed by the immersion cut and lastly the immersion route.

Keywords: Red tilapia, *Streptococcus agalactiae*, heat stress