



Toxic effects of 4-nonylphenol on the embryonic development of African catfish *Clarias gariepinus* (Burchell, 1822)

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Abstract:

The present study investigated effects of environmental relevant concentrations of 4-nonylphenol (0.05 to 0.08 to 0.1 mg/l) on the reproduction and embryonic developmental stages of catfish (*Clarias gariepinus*). To determine the effect of 4-nonylphenol on reproduction; catfish were exposed to three concentrations of 4-nonylphenol in a flow-through-system during spawning period (some for one week and other for two weeks). At an estimated 4-nonylphenol concentration the fertilization rate and hatching rate were significantly decreased with 4-nonylphenol concentrations increasing while the incubation period, the mortality rate and malformed embryos ratio were increased. Also, the development of embryos and larvae was affected by 4-nonylphenol in terms of morphological changes and histopathological alterations.

Keywords:

4-nonylphenol, hatching, mortality, embryos, *Clarias gariepinus*.

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