

EFFECT OF pH ON EARLY EMBRYO DEVELOPMENT OF ZEBRAFISH, *Danio rerio*

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Water pollution has become a leading environmental problem faced by today's world. It has been reported that the pH in water bodies has changed critically in past years along with the increasing land-use practices, industrial discharges and anthropological activities. Extreme acidic and alkaline pH levels affect the early embryo development of fish in lethal and sub-lethal levels, inducing low hatching rates and morphological abnormalities. Zebrafish (*Danio rerio*) is an ideal model for studying environmental and toxicological effects on early embryo development due to the small body size, transparency and ex-utero development of the embryo. The present study evaluated the hatching rate, hatching time, morphological abnormalities and mortality rates of zebrafish embryos exposed to pH ranging from 1 to 12. Desired pH solutions were prepared using 1 M HCl and NH₄OH at 27 °C. Distilled water (pH 7) was used as the control. All experiments were carried out up to 96 hpf (hours post-fertilization) with ten embryos per pH value and triplicated using different batches. Variations in hatching rate, time and mortality rate were obtained in different pH solutions compared to the control. The pH values of 3 and 10 were identified as lethal levels with 100% mortality, where embryos were turned opaque within 1 h. A hatching rate of 100% was observed from 6 – 8 pH range, and it ranged from 60 – 80% at pH of 4, 5 and 9. The highest hatching time of 78 ± 1.15 hpf was recorded at pH 4, where the lowest was at pH 7 at 68 ± 0.58 hpf. Embryo hatching occurred around 72 hpf. There were no morphological abnormalities detected in surviving embryos. The results show that zebrafish embryos can tolerate a wide range of pH, and the effect is minimal at pH 6 – 8 while having a 100% survival rate with a low hatching time.

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