

EFFECT OF JUVENILE EXPOSURE TO BISPHENOL-A AND BISPHENOL-S ON SEX RATIO AND SWIMMING SPEED OF ZEBRAFISH (*DANIO RERIO*)

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Bisphenol-A has become a universal environmental contaminant due to its heavy usage in the plastic manufacturing industry. It is a xenoestrogen which perturbs hormone signalling pathways affecting the growth and development of organisms. Bisphenol-S was introduced as a safe alternative to bisphenol-A. However, the relative safety of bisphenol-S has become questionable due to its endocrine disruption ability and environmental occurrence. Therefore, to comparatively assess the biological impact of bisphenol-A and bisphenol-S on freshwater organisms, zebrafish, a popular aquarium fish (*Danio rerio*) at the age of 67dpf (days post fertilization), were exposed to environmental concentrations (0.01 and 0.1 mg/l) of either bisphenol-S, bisphenol-A or treatment control (1% -v/v ethanol) in triplicate. After 35 days of exposure, the gender of adult zebrafish was identified by observing external morphology such as body shape and protruding belly. Female-biased sex ratios were observed in both concentrations of bisphenol-S and bisphenol-A treatments than in the control ($p < 0.05$). However, the sex ratios between comparable concentrations of bisphenol-S and bisphenol-A were not significantly different ($p > 0.05$). The maximum swimming speed of five random fish from each tank was measured using a swimming chamber. Swimming speed was significantly lower in fish exposed to bisphenol-S and bisphenol-A compared to the control ($p < 0.05$). The maximum swimming speed of fish in comparable concentrations of bisphenol-S and bisphenol-A was not significantly different ($p > 0.05$). Accordingly, the effects of bisphenol-S exposure on sex differentiation and the swimming speed of juvenile zebrafish were similar to that of bisphenol-A exposure in comparable concentrations. Therefore, based on the findings, bisphenol-S could not be recommended as a safe alternative to bisphenol-A. However, more comparative studies are recommended to comprehensively evaluate the relative safety of bisphenol-S on freshwater ecosystem health.

Keywords: Bisphenol-A, Bisphenol-S, Sex ratio, Swimming speed, Zebrafish (*Danio rerio*)