



Assessment of Fly Ash Induced Physiological and Reproductive Impairment in Female Flathead Grey Mullet (*Mugil cephalus*)

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Industrial fly ash released from thermal power plants is a source of heavy metal contamination in aquatic ecosystems, significant ecological risks to organisms. study the of fly ash associated heavy metals on the physiological and reproductive health of female flathead grey mullet, *Mugil cephalus*, collected from the Ennore coastal region, Chennai, India. A total of 20 adult female fish were between a polluted site by industrial fly ash deposition and a relatively unpolluted reference site. Physico-chemical analysis of water revealed environmental polluted site, including increased temperature (29.1 ± 0.92 °C), nitrate (1.42 ± 0.21 mg/L) and phosphate (0.82 ± 0.10 mg/L), along with reduced dissolved oxygen (4.12 ± 0.55 mg/L) compared to the control site. Atomic Absorption Spectrophotometry (AAS) showed elevated concentrations of chromium (250 ± 5.42 µg/g), zinc (150 ± 3.25 µg/g), nickel (120 ± 2.80 µg/g) and lead (70.81 ± 1.12 µg/g) in fly ash samples, with accumulation in ovarian tissues. ish exhibited reduced gonadosomatic index (0.19 ± 0.01) compared to control (0.22 ± 0.02), decreased RBC count ($1.85\text{--}2.25 \times 10^6$ cells/mm³), hemoglobin levels (5.80–6.30 g/dl) and elevated WBC counts ($17.80\text{--}19.40 \times 10^3$ cells/mm³). testosterone, progesterone, and estradiol, istological examination revealed ovarian degeneration and disrupted follicular findings demonstrate that chronic exposure to fly ash associated heavy metals significant reproductive, hematological and endocrine impairment in *Mugil cephalus*, highlight the need for effective pollution control and continuous in coastal ecosystems.

Keywords: *Fly ash, Heavy metal, Mugil cephalus, Ennore, Bioaccumulation, Ovarian histopathology, Coastal pollution.*