

A Study on Toxicity Effect of Mancozeb Fungicide Residual on Zebrafish (*Danio rerio*) Embryo

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Mancozeb fungicide which belongs to ethelene bisdithiocarbamates (EBDCs) chemical group causes potential hazard to human and environment. Considerable amount of this pesticide leaches through soil, air and accumulate in aquatic environment. The fungicide breaks down into ethylenethiourea (ETU) within two days and residuals remain in the aquatic environment. In this study, the effect of Mancozeb residuals on zebrafish embryo was performed according to OECD guideline and investigating the lethal end points, median lethal concentrations (LC₅₀) and morphological deformities at different concentrations. Range finding test was carried out initially, using different concentrations to determine the test concentration for toxicity. The embryo toxicity test for Mancozeb residual was performed over four days period according using 16-cell stage fertilized zebrafish embryos. Ten test concentrations (5, 2.5, 1.25, 0.64, 0.32, 0.16, 0.08, 0.04, 0.02 and 0.01) mg L⁻¹ Mancozeb residual was tested on 60 embryos pre-treatment. Lethality rate and morphological abnormalities were recorded at 24, 48, 72 and 96 hours post fertilization (hpf). LC₅₀ for 24, 48, 72 and 96 hours of exposure to Mancozeb residual was determined as 1.4, 1.15, 1.15, 1.15 mg L⁻¹ respectively. A significant difference was observed between Mancozeb residual and control group (P < 0.05). Coagulation of the embryo, non-detachment from the tail bud, lack of heartbeat and lack of somite formation were observed as lethal end points. Yolk sac and pericardial edema, degeneration of tail region, malformation of head and heart, retarded growth, twisted tail, shrinkage of chorion and spinal curvature were observed as morphological deformities. This study demonstrated that Mancozeb residual at 1.4 mg L⁻¹ was lethal at 24 hpf level and 1.15 mg L⁻¹ was lethal at 48, 72 and 96 hpf. The results indicated that Mancozeb residuals affect zebrafish (*Danio rerio*) embryo indicating its potential to cause environmental toxicity.

Keywords: Pesticide, Median lethal concentration, Fungicide, Environment, Zebrafish