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**Title:** Estimation of Some Heavy Metals in Polluted Well Water and Mercury Accumulation in Broiler Organs

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**Abstract:** The aim of this study was to investigate the relationship between the concentrations of heavy metals in well water and bioaccumulation of the most abundant metals in chicken tissues in some areas in the province of Mecca Almokaramah, Saudi Arabia. Among the heavy metals (Cd, Zn, Cr, Mn, Cu Hg, Pb and Ni) studied, mercury (Hg) revealed highest in concentration in well waters. The concentration of mercury in the ground water, beside in liver, kidney, muscle and blood samples of ten chickens from each of four poultry-production farms were estimated using atomic absorption spectrophotometer. The results showed that the kidney followed by liver had the highest bioaccumulation of mercury in all farm samples. The level of mercury in the ground water was 7.06 mu g/L. The relationship between mercury accumulation levels in the kidney and those in the liver tissues were proportionally correlated and altered with elevation in the antioxidant enzyme activities such as AST and ALT. These elevated enzymatic activities were induced by the level of toxicity. There was a significant elevation in the level of liver and kidney malondialdhyde (MDA), while the activities of antioxidant enzymes superoxide dismutase and catalase (SOD and CAT) were significantly decreased. Biochemical observations were supplemented by histopathological examination of liver and kidney sections.

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