This paper describes the fabrication and application of an inhibition-based enzyme biosensor proposed for environmental monitoring and assessment of heavy metal ions in aqueous solution. A maize tassel-multiwalled carbon nanotube (MT-MWCNT) composite material was prepared and used to immobilize horseradish peroxidase (HRP) on a glassy carbon electrode (GCE) to produce a biosensor responsive to H₂O₂. The biosensor was incubated in heavy metal solutions and the inhibited cathodic response determined amperometrically. The response was linear ($R^2 > 0.99$) over the concentration ranges 0.092 - 0.55 and 0.068 - 2.0 mg/L for Pb²⁺ and Cu⁺⁺ respectively, with limits of detection (LOD) values of 2.3 and 4.1 µg/L. Relative error values of 7.93 and 2.55 % were obtained for Pb²⁺ and Cu⁺⁺, respectively, when the biosensing technique was validated using a standard reference material. Recoveries of 96-104% were obtained when applied to the measurement of PtU and Cu⁻⁺ in tap water. The fabricated biosensor exhibited good stability, repeatability and reproducibility.