

Voltammetric Analysis of Cadmium in Blood and Urine using Hanging Mercury Drop Electrode (HMDE)

Ashok Kumar Jaiswal

Department of Forensic Medicine and Toxicology, All India Institute of Medical Sciences,
New Delhi – 110029, India.
ashokjaiswal72@gmail.com

Abstract—Background: Cadmium (Cd) is a metallic element present everywhere in our environment. It is inflammable, but in its powdered form, it releases toxic fumes which cause cadmium poisoning. The disease caused by exposure to Cd is known as Itai -Itai (ouch-ouch) disease. Various sophisticated analytical techniques like ICP-MS, AAS, etc. are usually used to assess levels of cadmium in biological samples. An attempt has been made to develop the method for the determination of cadmium in blood and urine with a voltammetric technique using Hanging Mercury Drop Electrode (HMDE).

Objective: To develop a simple and reliable method for voltammetric analysis of cadmium in blood and urine using Hanging Mercury Drop Electrode (HMDE).

Methods: Blood and urine samples were spiked with cadmium. The samples were processed by the closed digestion method using nitric acid.

Voltammetry determination of cadmium in the samples was carried out using Hanging Mercury Drop Electrode (HMDE). Voltammograms of blank, sample and standard were recorded. Extrapolation graph gives the amount of Cd present in the sample.

Results: The concentration of cadmium was successfully detected in all the spiked blood and urine samples. The method is suitable for the determination of cadmium in blood and urine. The limit of detection of the method is 0.1 µg/L for cadmium.

Conclusion: The developed voltammetry method is a simple, selective, sensitive, and reproducible technique for the quantitative determination of cadmium in blood and urine using Hanging Mercury Drop Electrode (HMDE).

Keywords—*Cadmium, HMDE, Blood, Urine etc*