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RESEARCH PAPER

A SIMPLE AND SENSITIVE ASSAY METHOD FOR BORON ESTIMATION BY DIFFERENTIAL PULSE VOLTAMMETRY IN INDIAN TRADITIONAL HERBO-MINERAL FORMULATION, *MAHAMRUTYUNJAYA RASA*

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By optimizing the analytical conditions, a reliable, rapid, simple and accurate differential pulse voltammetric method was developed for the quantitative determination of Boron in an ayurvedic formulation, Mahamrutyunjaya rasa. The effects of several chemicals and instrumental variables were studied, and optimized operating conditions were identified. Boron was determined in the incinerated formulated by differential pulse voltammetry, according to the monitoring the anodic peak of the complex formed between boron and Alizarin Red S (ARS) at -521 mV in ammonium acetate- phosphate buffer (pH = 7). Based on the above method, a calibration curve was established by plotting the peak current of the boron-ARS complex to the boron concentration with a linear range of 1-10 μg/ml. The sample analysis was performed in the presence of 1 mM EDTA for the elimination of interference from metal ions. The results indicated that this method has a detection limit of 0.2 μg/ml, based on signal to ratio of 3, an average recovery of 98-101% and a relative standard deviation (RSD) of 2.0%. The results obtained from this method were compared with inductively coupled plasma optical emission spectrometry (ICP-AES) method, and no significant difference was found. This method can provide a scientific and technical platform to the product manufacturers for setting up a quality control standard as well as to the public for quality and safety assurance of the proprietary ayurvedic formulations.

Key words: Boron, *Mahamrutyunjaya rasa*, Differential pulse, Voltammetry, Alizarin red.

INTRODUCTION

Herbo-mineral formulations have reached extensive acceptability as therapeutic agents for several diseases. The development of authentic analytical methods which can reliably profile the organic and inorganic composition, including quantitative analysis of the active compound and other major constituents, is a major challenge to scientists. Standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assured for the manufacturing of herbo-mineral drugs (Rai *et al* 2009). The WHO specifies guidelines for the assessment of the safety, efficacy and quality of herbal medicines as a prerequisite for global harmonization. *Mahamrutyunjaya rasa* (MHR) is an ayurvedic formulation used in the treatment of cardiac disorders. It contains roots of *Aconitum ferox*, *Solanum indicum*, fruits of *Piper longum, Piper nigrum,* Sulphur, Cinnabar and sodium metaborate. Borax or Sodium metaborate is an