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Authors: Sakae Yotsumoto Neto, Dênio Emanuel Pires Souto, Héliida Monteiro de Andrade, Rita de Cássia Silva Luz, Lauro Tatsuo Kubota, Flávio Santos Damos



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Visible LED light driven photoelectroanalytical detection of antibodies of visceral leishmaniasis based on electrodeposited CdS film sensitized with Au nanoparticles

Sakae Yotsumoto Neto ^a, Dênio Emanuel Pires Souto ^{b,c}, Héliida Monteiro de Andrade ^d, Rita de Cássia Silva Luz ^{a,b}, Lauro Tatsuo Kubota ^{b,c}, Flávio Santos Damos ^{a,b,*}

^a Department of Chemistry, Federal University of Maranhão-UFMA, 65080-805, São Luís, MA, Brazil

^b National Institute of Science & Technology in Bioanalytics, 13083-970, Campinas, SP, Brazil

^c Institute of Chemistry, State University of Campinas– UNICAMP, 13083-970, Campinas, SP, Brazil

^d Institute of Biological Sciences, Federal University of Minas Gerais-UFMG, 31.279-910, Belo Horizonte, MG, Brazil

^{1*} Corresponding author. Tel.: +55 98 3272 9411.

E-mail address: flavio.damos@ufma.br (F. S. Damos)

Highlights

- A photoelectrochemical approach was applied for the detection of *anti-Leishmania infantum* antibodies;
- Label-free based photoelectrochemical method for *anti-Leishmania infantum* antibodies detection;
- The photoelectrochemical sensor showed high ability to discriminate positive and negative serum samples.

Abstract

This work describes the development of a high sensitive photoelectrochemical immunosensor for the detection of *anti-Leishmania infantum* antibodies. The proposed sensor is based on cadmium sulphide films and gold nanoparticles deposited on indium tin oxide coated glass slide (AuNP/CdS/ITO). The band gap and flat band characteristics of AuNP/CdS platform were evaluated by UV-Vis spectrophotometry and electrochemical impedance spectroscopy. The effects of the nature, concentration, and pH of the buffer solution as well as the effects of the applied potential on the response of the photoelectrochemical platform to a donor molecule were investigated. Under optimized conditions, the AuNP/CdS/ITO platform modified with recombinant *L. infantum* antigens (C8/MPA-AuNP/CdS/ITO) shows a linear response range from 1 up to 300 nmol

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