

[AMT07]

Fabrication of photocurable ferrocene-containing methacrylates polymer for the use of glucose biosensors

Low Sim Bean¹, Lee Yook Heng¹, Bohari Yamin², Musa Ahmad¹

¹School of Chemical Sciences and ²Food Technology, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Selangor, Malaysia.

E-mail: simbeanlow@yahoo.co.uk

A single-step fabrication of glucose biosensors with simultaneous immobilization of both ferrocene mediator and glucose oxidase in a photocurable methacrylic film consists of poly(2-hydroxyethyl methacrylate), polyHEMA alone or poly(methyl methacrylate-co-2-hydroxyethyl methacrylate), poly(MH), were reported. The electrochemical behaviour of the ferrocene in the polymer films and their water absorption properties were investigated. The entrapped ferrocene compounds showed good redox behaviour in the photocured film and no significant leaching of the entrapped ferrocene and enzyme glucose oxidase from copolymer films was observed because of the low water absorption properties of the co-polymer films as compared to the homopolymer poly(2-hydroxyethyl methacrylate). Electrochemical studies of the ferrocene entrapped in the polymer films demonstrated slow diffusion properties. The glucose biosensors exhibited rapid response towards glucose, yielding a linear response range of 1.96-16.67 mM at low potentials depending on the polymer membranes used. Besides, the reproducibility and repeatability of the fabrication method were evaluated and the response of the biosensors fabricated was also studied over a period of two weeks.