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Polymer electrode material for microbial bioelectrochemical systems

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Bioelectrochemical systems based on polymer-bacteria thin film modified electrode were explored. The prepared polymer-bacteria modified copper electrode was characterized with voltametric methods, as cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). The proposed electrode indicated a definite redox response, high conductivity and electrochemical stability. The experimental results revealed that the prepared electrode could be a feasible for degradation of hazardous phenol pollutants. Oxidation of phenol was invested by cyclic voltammetry and EIS. EIS diagrams resulted in separate time constants; the oxidation of phenol is mostly represented by half a circle, whose diameter corresponds to the electron transfer resistance. Electron transfer resistance produced by polymer-bacteria modified copper electrode is less than that obtained by polymer modified copper electrode.

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Synthesis and solubilization of flurbiprofen derivatives and investigation of their biological activities

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Flurbiprofen is one of the most potent non-steroidal anti-inflammatory drugs. It is widely used for relief of pain in patients suffering from rheumatic diseases, migraine, sore throat and primary dysmenorrhea. However, its aqueous solubility is very low and hinders the skin permeation. Thus, it is imperative to develop such a drug delivery systems which can improve its aqueous solubility and hence improve the skin permeation and therapeutic compliance. Micro-emulsions have been also proven to increase the cutaneous absorption of lipophilic drugs as compared to conventional vehicles. Micro-emulsion is thermodynamically stable emulsion that has the capacity to 'hide/solubilize' water-insoluble molecules within a continuous oil phase. Therefore, flurbiprofen was converted to esters through chemical reactions with alcohols such as methanol, ethanol, propanol and butanol. The product was further treated with hydrazine to get hydrazide. The solubility of the parent drug flurbiprofen and the products were solubilized in micro-emulsions formed using various surfactants like ionic, non-ionic and zwitterions. It has been concluded that the product was more soluble than the parent compound. The biological activities of these were also investigated. The outcome was very promising and the product was more active than the parent compound. It therefore concluded that in this way we can not only enhance the solubility of the drug, increase its bioactivity but it also reduces the risk of stomach cancer.

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