P-C-618

# SURFACE MODIFICATION OF CAFFEIC ACID-GRAFTED POLY(LACTIC ACID) ELECTROSPUN FIBER MATS FOR BIOMEDICAL APPLICATIONS

Piyachat Chuysinuan, Pitt Supaphol,

*The Petroleum and Petrochemical College, Chulalongkorn University*

*nannoize@hotmail.com*

New biomaterial effective for use as topical/transdermal patches or wound dressings consisting of caffeic acid-grafted poly(lactic acid) electrospun fiber mats were developed. The grafting of caffeic acid onto poly(lactic acid) electrospun fiber mats were first modified with 1,6-hexamethylenediamine to introduce amino groups on their surface. The reactive groups were subsequently used to graft extracellular matrix molecule, caffeic acid, by using N,N?-disuccinimidylcarbonate (DSC) and N-Hydroxysuccinimide (NHS) as coupling agents. The existence of NH2 groups was quantified by ninhydrin assay. XPS analysis confirmed the presence of caffeic acid on the surface of the polymer. Water contact angle measurement showed that the hydrophilicity of the surface has improved obviously after aminolysis and caffeic acid-grafting. The potential for use of the neat and the caffeic acid-grafted PLA electrospun fiber mats as topical/transdermal patches or wound dressings was evaluated in terms of the antioxidant activity. The ability to support the cytotoxicity, the attachment and the proliferation of human dermal fibroblasts (HDFa) were cultured on the surface of the polymer. Indirect cytotoxicity evaluation revealed that both the neat and the modified PLA fiber mats released no substances at levels that were harmful to cells. The attachment on various types of PLA fiber mats was lower compared with that on TCPS. While, the proliferation was improved on the modified surface, with the cells grown on the caffeic acid-grafted electrospun fiber mats showed the greatest. On the other hand, the presence of caffeic acid imparted the antioxidant activity to the resulting the caffeic acid-grafted PLA electrospun fiber mats. Key-words: Electrospinning; Poly(lactic acid); Caffeic acid grafted; Antioxidant; Wound dressing