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PREPARATION OF SIX ARMS PCL-*b*-PEG STAR-SHAPED POLYMER HYDROGELWafiuddin Ismail^{1*}, Siti Hajar Ahmad Sharif¹ and Muhammad Salahuddin Haris²¹*Department of Chemistry, Kulliyah of Science, International Islamic University Malaysia,
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25200 Kuantan, Pahang Darul Makmur, Malaysia***Corresponding author: wafisnj@iium.edu.my***Abstract**

Most new develop drugs are hydrophobic and this property gives drawbacks in delivering the new drugs. An amphiphilic drug delivery cargo may overcome this problem with the features of both hydrophobic and hydrophilic. In this study, 6-arms star-shaped amphiphilic co-polymers with average molecular weight (Mn) of 10000 Da were synthesized and characterized for wound healing application. The 6-arms star-shaped polymer consist of polycaprolactone (PCL) hydrophobics system in the inner segment and poly(ethylene glycol) (PEG hydrophilic system in the outer segment. NMR and FTIR analyses showed that ring opening (ROP) of ϵ -caprolactone had occurred producing star-shaped homopolymer polycaprolactone (PCL) with di-pentaerythritol as core. Further reaction of these homopolymer with succinilated methoxy poly(ethylene glycol), (mPEG) produced amphiphilic star-shaped polymer consisted of PCL-*b*-PEG. Thermal analysis of the product using thermogeometric analysis (TGA) shows increased in thermal stability of the star-shaped polymer from 329.7 °C to 377.6 °C after the addition of mPEG. The star-shaped copolymer was incorporated into hydrogel formulation with Carbopol as gelling agent and Ciprofloxacin as drug model to investigate their ability as drug delivery system. The presence of PCL in the formulation showed high drug entrapment efficiency (>95%) via hydrophobic-hydrophobic interaction with the drug.