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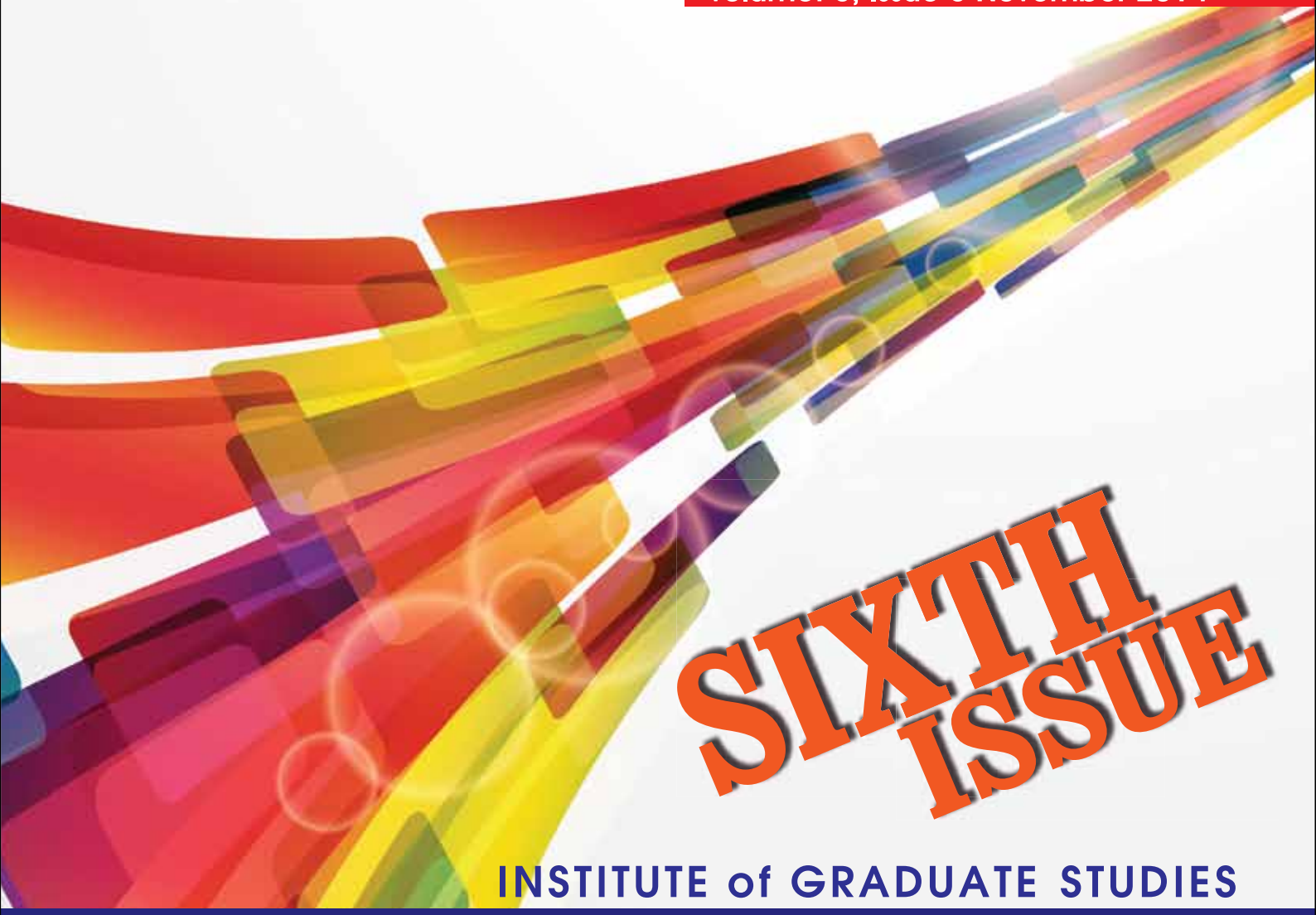

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Title :
Carboxymethylcellulose Scaffolds For Treatment Of Partial Thickness Burn Wound - The Aspects Of Wound Moist Regulation, Bacterial Burden Control And Tocotrienol Therapeutic

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Sodium carboxymethylcellulose (SCMC) is widely used in the design of wound dressing owing to its high water bonding capacity, good compatibility with skin and mucous membrane, biocompatibility and abundant availability at a low cost. This study aims to design drug-free (low (LV), medium (MV) and high molecular weight (HV)) SCMC scaffolds and promote their ability to promote partial thickness burn wound healing via wound moist regulation and microbial burden control. In addition, SCMC scaffolds of distinct wound healing ability is incorporated with γ-tocotrienol as antioxidant therapeutic and has its wound healing property assessed against pure tocopherol and tocotrienol. SCMC scaffolds were prepared by means of solvent evaporation technique and their physicochemical properties namely, in vitro erosion, moisture affinity, morphology, tensile strength, polymer molecular weight and carboxymethyl substitution were investigated against partial thickness burn wound. The transepidermal water loss (TEWL) from wound of rats treated by control > HV scaffold > LV – MV scaffold. HV scaffold possessed the highest tensile strength of all matrices and was resistant to erosion in simulated wound fluid. In spite of constituting small nanopores, it afforded a substantial TEWL than MV and LV scaffolds from wound across an intact matrix through its low

moisture affinity characteristics. HV scaffold was also found to protect moisture loss with minimal accumulation at wound bed thus promoted reepithelialisation process. Transepidermal water movement wound healing by scaffolds was governed by SCMC molecular weight instead of its carboxymethyl substitution degree or matrix pore size distribution. In infected partial thickness wound, *in vitro* polymer characteristics, microstructure, gelling, bioadhesiveness, microbial inhibitory, *in vivo* microbe-colonized wound healing, microbe removal and infection control properties were examined against Gram positive *Staphylococcus aureus* and Gram negative *Pseudomonas aeruginosa. P. aeruginosa* was removed via gelling action of LV scaffold which encapsulated microbes possibly with the binding aid of their extracellular by-product. *S. aureus* was removed via HV scaffolds ability to crease into multiple tight folds to accommodate the microbes under compression and retarded its growth. SCMC scaffolds promoted healing via physical attachment and removal from wound bed which was generally aided via high polymeric carboxymethyl substitution degree and subseqeuent increased of bioadhesive property of the scaffolds. The HV-PVP scaffolds served as the vehicle of γ-tocotrienol. The vitamin incorporation was characterised by drug content of 91.238 ± 0.137 %. The instantaneous vitamin release from the carrier may affect the initial wound healing process as bi-mechanisms of modulating the transepidermal water loss contributed by the HV-PVP carrier and antioxidant activity of γ-tocotrienol. The used of HV-PVP scaffold as the carrier for γ-tocotrienol deemed to optimize its delivery to the wounded area and showed promising outcome in wound healing process.