Turkish Journal of Physiotherapy and Rehabilitation; 32(3)
ISSN 2651-4451 | e-ISSN 2651-446X

Development and Characterisation (Drug Loading, Drug Release And Expansion Study) of CMC-PEG and SA-PEG Based Hydrogel As Wound Healing Materials

Kimberly Ting Keh Lee[1], *Najwa Mohamad[1], Waheedah Abdul Hakeem[1], Mohd Cairul Iqbal Mohd Amin[2], Fataheya Buang[2]

[1]Faculty of Pharmacy, University of Cyberjaya, Cyberjaya, 63000, Malaysia
[2]Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, 50300, Malaysia.

*Corresponding author: najwa@cyberjaya.edu.my

ARTICLE INFO

Article history:

Keywords:
Hydrogel
Carboxymethyl cellulose
Sodium alginate
Wound dressing
Polymer

ABSTRACT

Hydrogels are 3-D cross-linked networks of water soluble polymers with porous structure which permits water holding and drug loading within its structure. They are widely used in clinical practice and in experimental medicines. The objectives of this present study were to develop and characterise carboxylmethyl cellulose (CMC) and sodium alginate (SA) based hydrogel as wound dressing materials. Unloaded SA based hydrogels exhibit better expansion and gel integrity over unloaded CMC based hydrogels inferring that SA based hydrogels are suitable for wounds with high exudates while CMC based hydrogels are less suitable for exudating wounds. Loaded SA based hydrogel shows steady OCT release while loaded CMC based hydrogel inconsistent rapid release of OCT which may increase the risks systemic and local toxicity. This study showed that both CMC based and SA based hydrogels possess potential as wound dressing materials and some modifi-cations can be done to improve the hydrogels.

1. Introduction

Hydrogels are 3-D cross-linked networks of water soluble polymers which has the capacity to hold water within its porous structure. Their porosity also permits loading of drugs into the gel matrix and subsequent drug release at a rate dependent on the diffusion coefficient of the small molecule or macromolecule through the gel network. The hydrogels are widely used in clinical practice and in experimental medicines in a very wide range. (Bhagat, 2012; Datta, 2007; Hoare & Kohane, 2008).Hydrogel dressings are nonreactive, permeable to metabolites and are non-irritant. Hydrogels promotes moist healing and cool the surface of the wound. The use of a hydrogel gel dressing helped reduce the pain considerably in chronic leg ulcer patients. They leave no residue, are malleable and improve reepithelization of wounds (Boateng et al., 2008).