

# Development And Characterisation (Drug Loading, Drug Release And Expansion Study) Of Carboxymethylcellulose – Sodium Alginate Based Hydrogel As Wound Dressing Application

**\*Najwa Mohamad, Punitha Govintharaju**

Department of Pharmaceutical Sciences, Faculty of Pharmacy, University of Cyberjaya, Cyberjaya, 63000, Malaysia.

Email : [najwa@cyberjaya.edu.my](mailto:najwa@cyberjaya.edu.my)

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## Abstract

Sodium alginate (SA) and Carboxymethylcellulose (CMC), a cellulose derivative, has been used in wound dressing since it has good biocompatibility, hydrophilic, non-toxic and non-allergenic. This study is to develop and characterize CMC-SA based hydrogel as wound dressing material and also to incorporate Octenidine Dihydrochloride (OCT) as antimicrobial agent into the hydrogel and evaluate its release. The CMC-SA hydrogel was formulated using physical crosslinking method, and PEG was used as plasticizer. Following the formulation, the formulation was visually examined for several characteristics. Expansion study was conducted and Franz cell drug permeation study was done for the drug loaded hydrogel to determine the pattern of OCT release from hydrogel. The resulting hydrogel formulation was clear and, homogenous and showed a good expansion capacity up to 48 hours. 0.5% of OCT is incorporated into the hydrogel and a controlled release pattern was observed in CMC-SA based hydrogel. Based on the expansion study, the CMC-SA-OCT hydrogel is suitable to be used on highly suppurating wound but should be changed every 24 hours. This study has revealed that CMC-SA based hydrogel could be a promising wound dressing material in therapeutic applications and it can be used for highly suppurating wounds due to its characteristics.

**Keywords:** Carboxymethylcellulose, sodium alginate, hydrogel, wound dressing

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## 1.0 Introduction

According to [1] it also have been demonstrated the effectiveness of providing moist environment to the wounds would help to promote healing of punctured wounds, damaged tissues and also burnt skin tissues. It was demonstrated that the process of healing of a wound is faster when a wet dressing as provided by hydrogel instead of a dry dressing [2]. Classification of wound dressing is based on functioning mechanism of hydrogel, primary, secondary, island, traditional and modern dressing respectively [3]. It has been reviewed by Jones in a study, the shortcomings due to the use of the traditional dressing [4]. Modern dressings that has been improved and developed is able to sustain and provide a moisture environment to promote a better