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Modification of xanthan gum hydrogel with NaCMC biopolymer for controlled drug delivery

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The selection, modification and elaboration of new materials for various applications are important criteria in the development of innovative products. This research is intended to develop a new cross-linked modified xanthan gum hydrogel with sodium carboxymethylcellulose (NaCMC), to characterize its properties, and to investigate its potential application in controlled drug delivery. The intended hydrogel would be synthesized at varying levels of sodium carboxymethylcellulose and the cross-linking agent (sodium trimethaphosphate). FTIR will be used to confirm cross-linking and the morphology will be studied with scanning electron microscopy (SEM). The swelling response of this hydrogel will be tested in aqueous solution at different temperatures (15 to 40 °C,) and at varying pH (4-10) for 1 hour. Swelling properties will also be studied in different simulated biological solutions (SBS): Glucose Solution GS and Mammalian Physiological Saline (MPS) at 37°C, pH 7 for 3 hours. Network parameter such as gel mesh size of the films will be investigated. Permeation of suitable cationic and anionic drugs will also be investigated. High swelling ratios are expected at high NaCMC levels due to the polyelectrolyte nature of NaCMC and the anionic charges on xanthan gum. Permeability of cationic drugs across the polymeric film is expected to be higher than anionic drugs mainly due to the electrostatic attraction between unlike charges and repulsion between like charges of the drugs and the hydrogel film. Obtaining such a result will suggest a potential application of the hydrogel as a film-forming material in controlled drug delivery formulations.

Biography

Julius Asi Gyabaah gained his Bachelor's degree in Laboratory Technology from University of Cape Coast and is now studying Master of Science in Bioengineering at Cyprus International University. He worked as a Research Assistant at the Department of Laboratory Technology, University of Cape Coast for one year before taking an appointment as a Laboratory Technologist at the Brong Ahafo Regional Hospital. He has co-published one paper in reputed journal.

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