

Polyacrylamide-metilcellulose hydrogels containing aloe barbadensis extract as dressing for treatment of chronic cutaneous skin lesions

Desireé Alesa Gyles, Anivaldo Duarte Pereira Júnior, Lorena Diniz Castro, Andressa Santa Brigida, Maria Louze Nobre Lamarão, Wagner Luiz Ramos Barbosa, José Otávio Carrera Silva Júnior and Roseane Maria Ribeiro-Costa

University of Technology, Jamaica

Abstract

Chronic wounds are severe breaks in the skin barrier that fail to heal in an acceptable time-frame, thus preventing the complete restoration of the tissue's anatomical and functional integrity, increasing the likelihood of infections and apoptosis. Hydrogels are known as a drug delivery system and have the potential to cover wounds and burns on the skin. Aloe barbadensis contains over 75 different bioactive compounds which are responsible for its anti-inflammatory and antimicrobial properties. In this study, the polyacrylamide-co-methylcellulose hydrogel containing Aloe barbadensis was developed. The extract was prepared from lyophilized Aloe barbadensis, using methanolic extraction, characterized by high performance liquid chromatography and incorporated into the hydrogels. These aloe barbadensis hydrogels were characterized by degree of swelling, fourier-transform infrared spectroscopy, scanning electron microscopy and thermal profiling using thermogravimetric analysis. The minimum inhibitory concentration test was done on the aloe barbadensis extract to evaluate its antibacterial and antifungal activity in vitro. The aloe barbadensis hydrogels were shown to swell to almost 2000% of their original sizes. The Fourier-transform infrared spectroscopy indicated the presence of bands characteristic of Aloe barbadensis and hydrogel polymers. The basic hydrogel showed greater thermal stability than the hydrogels with aloe barbadensis. The minimum inhibitory concentration showed inhibition of the growth of *S. aureus* and *Salmonella* spp. at specific concentrations. The hydrogel therefore presents itself as an excellent potential curative cover of cutaneous lesions.

Biography

Desireé Gyles is a pharmaceutical scientist holding a masters of science degree in pharmaceutical science from the federal university of para (UFPA) and an undergraduate degree in biological science. Her area of emphasis is drugs and medicines, with interest in the biological evaluation of natural and synthetic products. She has contributed two publications thus far: A review of the designs and prominent biomedical advances of natural and synthetic hydrogel formulations (2017) and The synthesis and evaluation of polyacrylamide-methylcellulose hydrogel containing *Aloe barbadensis* Miller as a wound healing treatment (2020). She has collaborated on research teams including the pharmaceuticals and natural products development team – university of technology, Jamaica (UTech, Ja) (2017 - present) and the team in the laboratory of physicochemical quality Control and nanotechnology at UFPA (2015-2017). Currently, she lectures in the School of Pharmacy at UTech, Ja as she continues her work with nanogels and their application to viral replication.



[Webinar on Nanomaterials](#) | August 28-29, 2020

Citation: Desireé Alesa Gyles, Polyacrylamide-metilcellulose hydrogels containing aloe barbadensis extract as dressing for treatment of chronic cutaneous skin lesions, Nanomaterials Congress 2020, Webinar on Nanomaterials, August 28-29, 2020 | Webinar, 04